ENVIRONMENTAL ASSESSMENT OF INSTALLATION DEVELOPMENT AT FAIRCHILD AIR FORCE BASE, WASHINGTON

HEADQUARTERS AIR MOBILITY COMMAND

MAY 2007

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14. ABSTRACT

Fairchild AFB uses numerous wing-approved plans to project installation development requirements. These plans propose demolition, construction, renovation, and infrastructure improvement activities intended to ensure that the installation can sustain its current and future national security operations and mission-readiness status. These projects include installation development projects contained in the Fairchild AFB General Plan and the community of all existing wing-approved development plans. Fairchild AFB seeks to improve the continuing installation development process by evaluating in a single EA all actions proposed in the Fairchild AFB wingapproved community of plans for installation development, called the Installation Development EA (IDEA). The Proposed Action includes numerous projects, such as new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, community living upgrades, infrastructure upgrades, demolition of aging facilities and recreational facility upgrades that would be completed/implemented during the next 5 years. The intent of this IDEA is to address the Proposed Action of implementing installation development actions as found in the community of all existing approved management plans concerning continuing development on Fairchild AFB. The scope of the IDEA includes an evaluation of alternatives for the various projects and an analysis of the cumulative effects on the natural and man-made environments. Through this IDEA, Fairchild AFB provides a constraints-based environmental impact analysis of installation development actions projected over the next 5 years. A constraints approach enables Fairchild AFB to evaluate environmental concerns that exist throughout the installation and those unique to specific areas of the installation. The analysis draws from the knowledge gained from extensive recent evaluations for similar types of projects to determine the direct, indirect, and cumulative effects of projects that would be completed as part of the installation?s development. This EA has been prepared to evaluate the Proposed Action and alternatives, including the No Action Alternative. If potentially significant impacts are determined to be associated with the Proposed Action during the course of preparing this IDEA, it might be necessary to prepare an Environmental Impact Statement (EIS). Resource areas addressed in the EA include noise, land use, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, infrastructure, and hazardous materials and waste management. The EA will be made available to the public for comments during development and upon completion.

15. SUBJECT TERMS

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

ENVIRONMENTAL ASSESSMENT (EA) OF INSTALLATION DEVELOPMENT AT FAIRCHILD AIR FORCE BASE, WASHINGTON

INTRODUCTION

In an effort to improve installation planning, streamline compliance with the National Environmental Policy Act (NEPA), and accomplish installation development, the 92d Air Refueling Wing and Headquarters Air Mobility Command have initiated an environmental assessment (EA) of all reasonably foreseeable projects, planned and programmed for the next five years at Fairchild Air Force Base (AFB). Since the establishment of Fairchild AFB, installation development has been a continuing activity. Each year, structures are demolished, facilities are constructed, and infrastructure is upgraded. This decision document is based on an installation development environmental assessment (IDEA) attached to and incorporated herein by reference. The intent of IDEA is to analyze the proposed action of implementing all installation development projects on Fairchild AFB that avoid environmentally sensitive areas.

The proposed action includes projects scheduled to be executed during the next five years including facility construction, repair or renovation, upgrades to utilities and infrastructure, and the demolition of unneeded facilities. The scope of the IDEA includes an evaluation of alternatives for the projects and an analysis of their direct, indirect and cumulative effects on the natural and man-made environments.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the proposed action is to implement the wing-approved installation development projects found within all community plans for Fairchild AFB including the base general plan. All plans for Fairchild AFB were examined to produce a consolidated list of projects to accomplish the planned and programmed development of the installation over the next five years. The proposed action does not include any projects identified to have a potential to impact in wetlands, floodplains, or areas where threatened and endangered species are known to occur.

The need for the proposed action is to support air mobility and unified command missions associated with Fairchild AFB. This need involves meeting ongoing mission requirements while supporting the morale and welfare of the warfighter and preparing the installation to accept additional missions in the future.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is to implement the installation development projects found in the community plans for Fairchild AFB. The projects in the proposed action analyzed by the IDEA fall under three categories: demolition, construction including renovations, alterations and repairs, and infrastructure projects. The IDEA used information obtained from other environmental impact analysis process documents for similar actions to determine the direct,

indirect, and cumulative impacts of the projects proposed for installation development at Fairchild AFB.

Demolition Projects. Fairchild AFB proposes eight demolition projects over the next five years to achieve efficiency and support growth associated with its mission requirements. The facilities scheduled for demolition have been deemed too costly to repair or renovate, and no longer meet the mission needs of Fairchild AFB. The demolition of these facilities would provide approximately 422,769 square feet of usable land space and reduce the need to construct new facilities on undeveloped land.

Construction Projects. Fairchild AFB proposes 28 facility construction, renovation, repair, and alteration projects over the next five years to support mission requirements and comply with anti-terrorism/force protection criteria. The construction of these facilities would occupy approximately 877,500 square feet. Much of this construction would occur as additions to existing facilities or on vacant land cleared by the demolition of unneeded structures. It is estimated that the construction projects on Fairchild AFB would add 756,000 square feet of impervious surface. New facilities would be constructed in areas zoned to ensure compatible land use.

Infrastructure Projects. Fairchild AFB proposes four infrastructure projects over the next five years. These projects include upgrades to or development of utilities, campground parking facilities, and energy management systems. The improvement to infrastructure will result in 77,450 linear feet of new, repaired, and extended utility systems, and 28,000 square feet of concrete pad sites for recreational vehicles.

SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED ACTION

Minor, short-term, direct adverse effects resulting from construction and demolition activities would impact the noise environment, air quality, safety, geological resources, water resources, biological resources, and hazardous materials and wastes. Adverse effects associated with construction activities would be localized to the immediate area of construction and would subside following the end of construction in each affected area. Construction would cause a minor, short-term benefit to the socioeconomics of the local community due to construction employment and the purchase of local goods and services.

Minor, long-term, direct beneficial effects on land use, safety and infrastructure would be expected from the construction of new facilities and through demolition of unneeded facilities.

Minor, short-term adverse effects and long-term benefits would be expected due to the removal of any asbestos-containing material and lead-based paint in older buildings. All removal and abatement procedures would be in accordance with federal, state and local regulations. Construction proximate to any environmental restoration program site would be accomplished in accordance with federal, state and local regulations.

The proposed action does not include siting projects in wetlands, floodplains, or areas where threatened and endangered species are known to occur. Construction activities determined to have the potential to affect federally-listed threatened or endangered species, state-protected species or their habitat would involve separate consultation with the appropriate federal and state agencies. Similarly, any project analyzed by this IDEA, which is subsequently identified to impact a wetland or floodplain, would be coordinated with the appropriate federal and state

regulatory authorities to obtain necessary approval and ensure best management practices are used to minimize erosion and sedimentation. Additional environmental analysis would be required if the potential to adversely impact wetlands, threatened or endangered species, or other protected natural resources is identified during project design or execution.

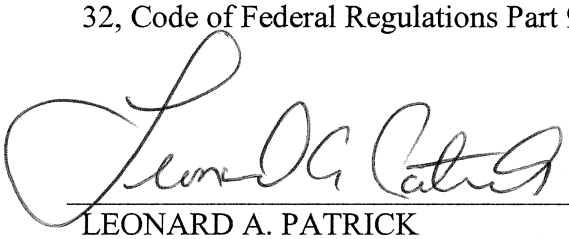
No direct or indirect effects on archaeological resources or traditional cultural properties are anticipated because no project having a potential to affect cultural resources was included in the proposed action. As described in the Fairchild AFB integrated cultural resources management plan, all construction and demolition activities associated with this proposed action, which are subsequently identified to have the potential to affect an historical resource, will be coordinated with the Washington State Department of Archaeology and Historic Preservation prior to initiation of the undertaking in accordance with section 106 of the National Historic Preservation Act.

PUBLIC REVIEW AND INTERAGENCY AND INTERGOVERNMENTAL COORDINATION

The interagency and intergovernmental coordination for environmental planning (IICEP) process was conducted from 27 June to 27 July, 2006, on the draft description of proposed action and alternatives, and public review of the draft IDEA was conducted from 27 March to 26 April, 2007.

FINDING OF NO SIGNIFICANT IMPACT

I conclude that the environmental effects of the proposed installation development at Fairchild AFB are not significant, that preparation of an environmental impact statement is unnecessary, and that a finding of no significant impact is appropriate. The preparation of the IDEA is in accordance with the NEPA, the regulations of the Council on Environmental Quality, and Title 32, Code of Federal Regulations Part 989, as amended.



15 Aug 07

LEONARD A. PATRICK
Brigadier General (Sel), USAF
Director, Installations & Mission Support

Date

Attachment: Environmental Assessment

ABBREVIATIONS AND ACRONYMS

°F	Fahrenheit
µg/m^3	micrograms per cubic meter
92 ARW	92nd Air Refueling Wing
92 CE	92nd Civil Engineering
92 CES/CEV	92nd Environmental Flight
ACM	Asbestos-containing material
AETC	Air Education and Training Command
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFPD	Air Force Policy Directive
AFR	Air Force Reserve
AGE	Aerospace Ground Equipment
AMC	Air Mobility Command
AMSA	Area Maintenance Support Activity
ANG	Air National Guard
AOD	Area of Development
APE	Area of Potential Effect
AQCR	Air Quality Control Region
AT/FP	Anti-Terrorism/Force Protection
BGP	Base General Plan
BMP	Best Management Practices
BPA	Bonneville Power Administration
BRAC	Base Realignment and Closure
C&D	construction and demolition
CAA	Clean Air Act
CAIS	Chemical Agent Identification Sets
CATEX	Categorical Exclusion
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	Carbon monoxide
CWA	Clean Water Act
CY	Calendar Year
dB	decibels
dBA	A-weighted sound level measurements
DNL	Day-Night Average A-weighted Sound Level
DNR	Department of Natural Resources
DOD	Department of Defense
DOPAA	Description of the Proposed Action and Alternatives
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EMCS	Energy Management Control System
EO	Executive Order
EPF	Environmental Planning Function
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESPC	Energy Saving Performance Contract
ESQD	Explosive Safety Quantity Distance
EWNII	Eastern Washington-Northern Idaho Interstate
FAA	Federal Aviation Administration
FAMCAMP	Family Campground
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft^2	square feet
FUB	Facility Utilization Board
FY	Fiscal Year
GOV	Government-owned vehicle
gpd	gallons per day
HAZMART	Hazardous Materials Pharmacy
HAZWOPER	Hazardous Waste Operations and Emergency Response
HMMP	Hazardous Materials Management Plan
HPA	Hydraulic Project Approval
HQ	Headquarters
HSWA	Hazardous and Solid Waste Amendment
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating, Ventilation, and Air Conditioning
HWMP	Hazardous Waste Management Plan
I-90	Interstate Highway 90
ICRMP	Integrated Cultural Resources Management Plan
IDEA	Installation Development Environmental Assessment
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
IPTC	Isolated Personnel Training Compound

JIITL	Joint Integrated Intelligence Training Laboratory
JPRA	Joint Personnel Recovery Agency
JPRTF	Joint Personnel Recovery Training Facility
kV	kilovolts
KW	Kilowatts
LBP	Lead-based paint
L_{dn}	Average Day night Decibel Level
LUC	Land use constraints
MAJCOM	Major Command
MFH	military family housing
mg/m^3	milligrams per cubic meter
MILCON	Military Construction
MSA	Metropolitan Statistical Area
msl	mean sea level
MSW	municipal solid waste
NAAQS	National Ambient Air Quality Standards
NAF	Nonappropriated Funds
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
O_3	ozone
OMS	Organizational Maintenance Shop
OSHA	Occupational Safety and Health Administration
Pb	lead
pCi/L	picocuries per liter
$PM_{10/2.5}$	particulate matter equal to or less than 10/2.5 microns in diameter
POL	petroleum, oils, and lubricants
POP	Point of Presence
POV	Privately owned vehicle
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTU	Physiological Training
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
ROI	Region of Influence
RV	Recreational Vehicle
SARA	Superfund Amendments and Reauthorization Act
SCAPCA	Spokane County Air Pollution Control Authority
SCDBP	Spokane County Department of Building and Planning
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMA	Shoreline Management Act
SO_2	Sulfur dioxide
SRMC	Sustainment, Restoration, and Modernization for Contract
SWPPP	Storm Water Pollution Prevention Plan
T&E	Threatened and Endangered Species
TMDL	Total Maximum Daily Load
tpy	tons per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tanks
UXO	unexploded ordnance
VHS	variable high speed
VOC	Volatile organic compound
WAARNG	Washington Army National Guard
WAC	Washington Administrative Code
WANG	Washington Air National Guard
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington State Department of Ecology
WNHP	Washington National Heritage Program

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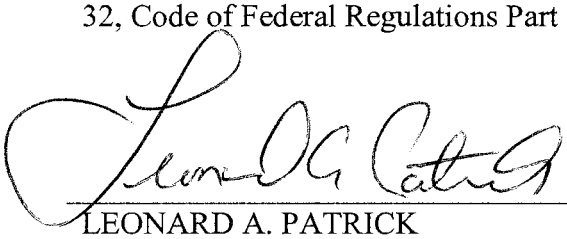

15 Aug 07

LEONARD A. PATRICK
Brigadier General (Sel), USAF
Director, Installations & Mission Support

Date

Attachment: Environmental Assessment

COVER SHEET

ENVIRONMENTAL ASSESSMENT OF INSTALLATION DEVELOPMENT AT FAIRCHILD AIR FORCE BASE, WASHINGTON

Responsible Agencies: U.S. Air Force (USAF), Headquarters Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois, and Fairchild AFB, Washington

Affected Location: Fairchild AFB, Spokane County, Washington

Proposed Action: Implementation of 92 ARW approved installation development plans

Report Designation: Environmental Assessment (EA)

Written comments and inquiries regarding this document should be directed to Mr. Gerald Johnson, 92 CES/CEV, 100 W. Ent Street, Suite 155, Fairchild AFB, WA 99011-9688

Abstract: Fairchild AFB uses numerous wing-approved plans to project installation development requirements. These plans propose demolition, construction, renovation, and infrastructure improvement activities intended to ensure that the installation can sustain its current and future national security operations and mission-readiness status. These projects include installation development projects contained in the Fairchild AFB General Plan and the community of all existing wing-approved development plans. Fairchild AFB seeks to improve the continuing installation development process by evaluating in a single EA all actions proposed in the Fairchild AFB wing-approved community of plans for installation development, called the Installation Development EA (IDEA). The Proposed Action includes numerous projects, such as new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, community living upgrades, infrastructure upgrades, demolition of aging facilities, and recreational facility upgrades that would be completed/implemented during the next 5 years. The intent of this IDEA is to address the Proposed Action of implementing installation development actions as found in the community of all existing approved management plans concerning continuing development on Fairchild AFB. The scope of the IDEA includes an evaluation of alternatives for the various projects and an analysis of the cumulative effects on the natural and man-made environments.

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Headquarters Air Mobility Command
Community Planning Branch
507 Symington Drive
Scott Air Force Base, Illinois 62225-5022

MAY 2007

ENVIRONMENTAL ASSESSMENT OF INSTALLATION DEVELOPMENT AT FAIRCHILD AIR FORCE BASE, WASHINGTON

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1. Purpose, Need, and Scope

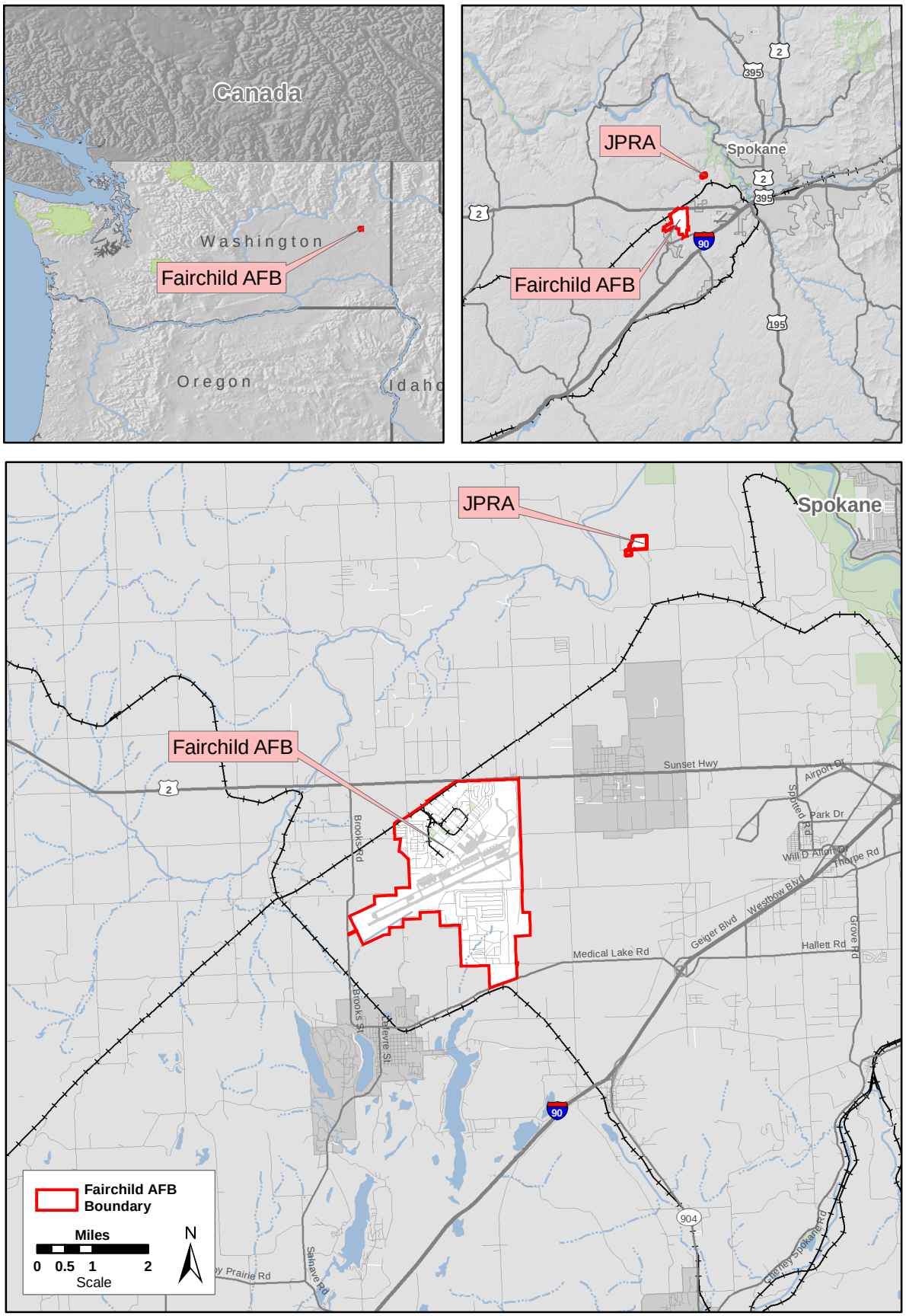
The 92d Air Refueling Wing (92 ARW) at Fairchild Air Force Base (AFB), Washington, and Headquarters (HQ) Air Mobility Command (AMC) believe a comprehensive U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) document would improve the continuing activity of installation development and streamline the National Environmental Policy Act (NEPA) compliance process. As a result, 92 ARW and HQ AMC have initiated an evaluation in this Environmental Assessment (EA) of all foreseeable and reasonable planned and programmed projects for the next 5 years. Since the establishment of Fairchild AFB, as with all other USAF installations, a continuing activity of installation development has been occurring. Every year in the history of the installation, structures have been demolished, new facilities constructed, and infrastructure upgraded. This document will constitute an Installation Development Environmental Assessment (or "IDEA"). The intent of this IDEA is to address the Proposed Action of implementing installation development actions as found in the community of all existing approved management plans for the installation concerning continuing development on Fairchild AFB. These projects are a compilation of installation development activities as described in the Fairchild AFB General Plan (92 ARW 2005), and all known and approved base plans. The IDEA plan coordinates land use planning and infrastructure projects, expedites project execution by using early planning, and encourages agency coordination. In addition to evaluating the projects as described, this EA will serve as a baseline for future environmental analysis of mission and training requirements.

This section of this document includes five subsections: background information on the location and mission of Fairchild AFB, a statement of the purpose of and the need for the Proposed Action, an overview of the scope of the analysis, a summary of key environmental compliance requirements, and an introduction to the organization of this EA.

1.1 Background

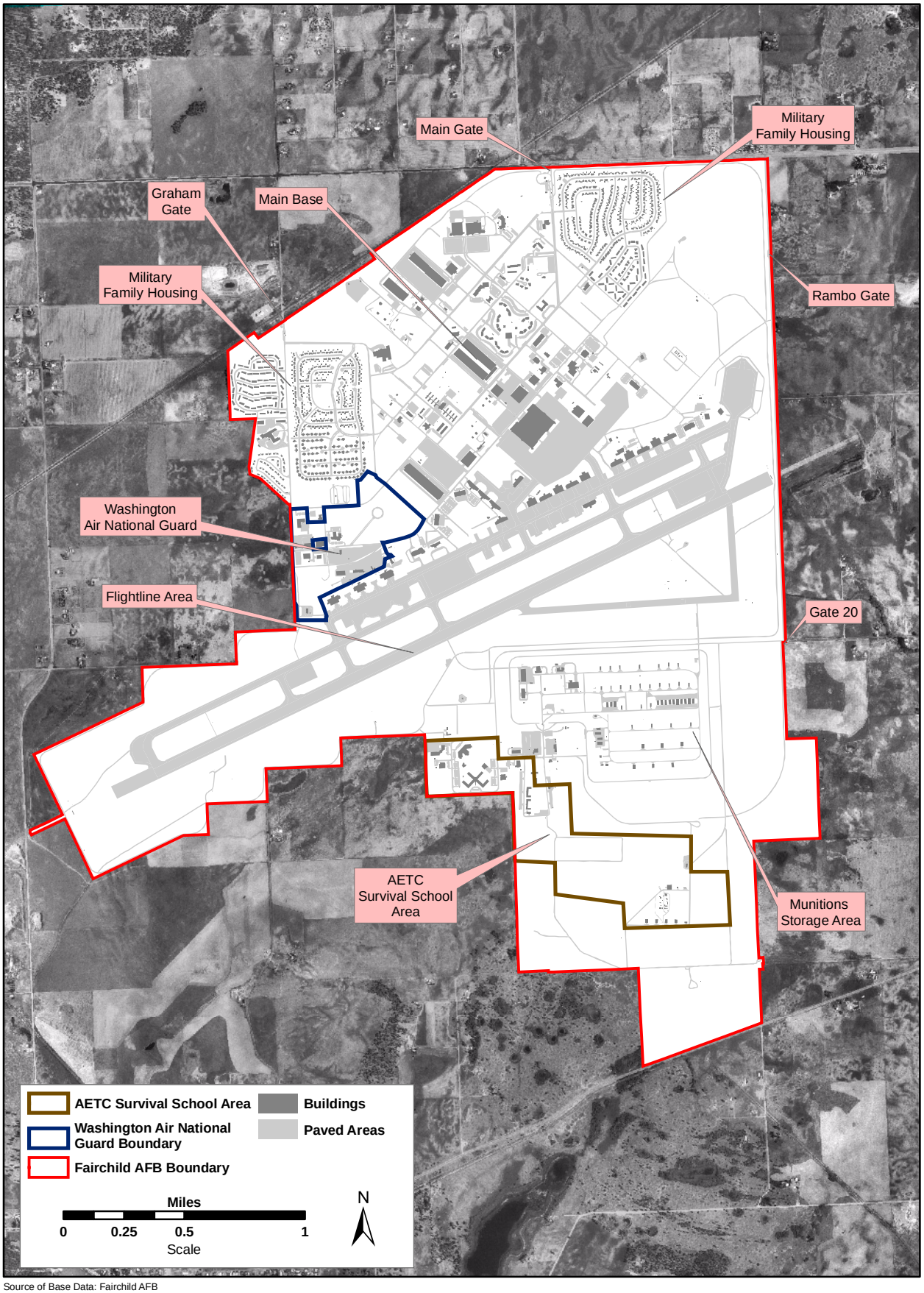
Fairchild AFB is 10 miles west of Spokane, Washington, in the east-central part of the state (**Figure 1-1**). The installation is under the command and control of AMC. Fairchild AFB proper consists of 4,216 acres and 1,353 buildings. It is home to the 92 ARW and is a tanker hub of the Northwest. Its rich history and important mission make it one of the nation's preeminent military installations, as is proudly affirmed in its mission statement. The wing operates 35 KC-135 aircraft and 56 aircrews to support worldwide military mission, refueling fighter, bomber, reconnaissance, and airlift aircraft as well as providing rapid and reliable passenger and cargo airlift. In addition to the 92 ARW, Fairchild AFB is home to more than 15 tenant units, including the Air Education and Training Command (AETC) Survival School and the 141st Air Refueling Wing, Washington Air National Guard (WANG) (**Figure 1-2**). The 92 ARW also provides administrative, medical, and logistical support for additional tenant agencies and the Fairchild AFB community.

The AETC Survival School occupies 127 acres on Fairchild AFB and uses approximately 500,000 acres of permitted Forest Service and private lands to conduct survival training off-installation (**Figure 1-3**). The Joint Personnel Recovery Agency (JPRA)-West White Bluff is a secure 45-acre compound approximately 10 miles northeast of Fairchild AFB (**Figure 1-4**).



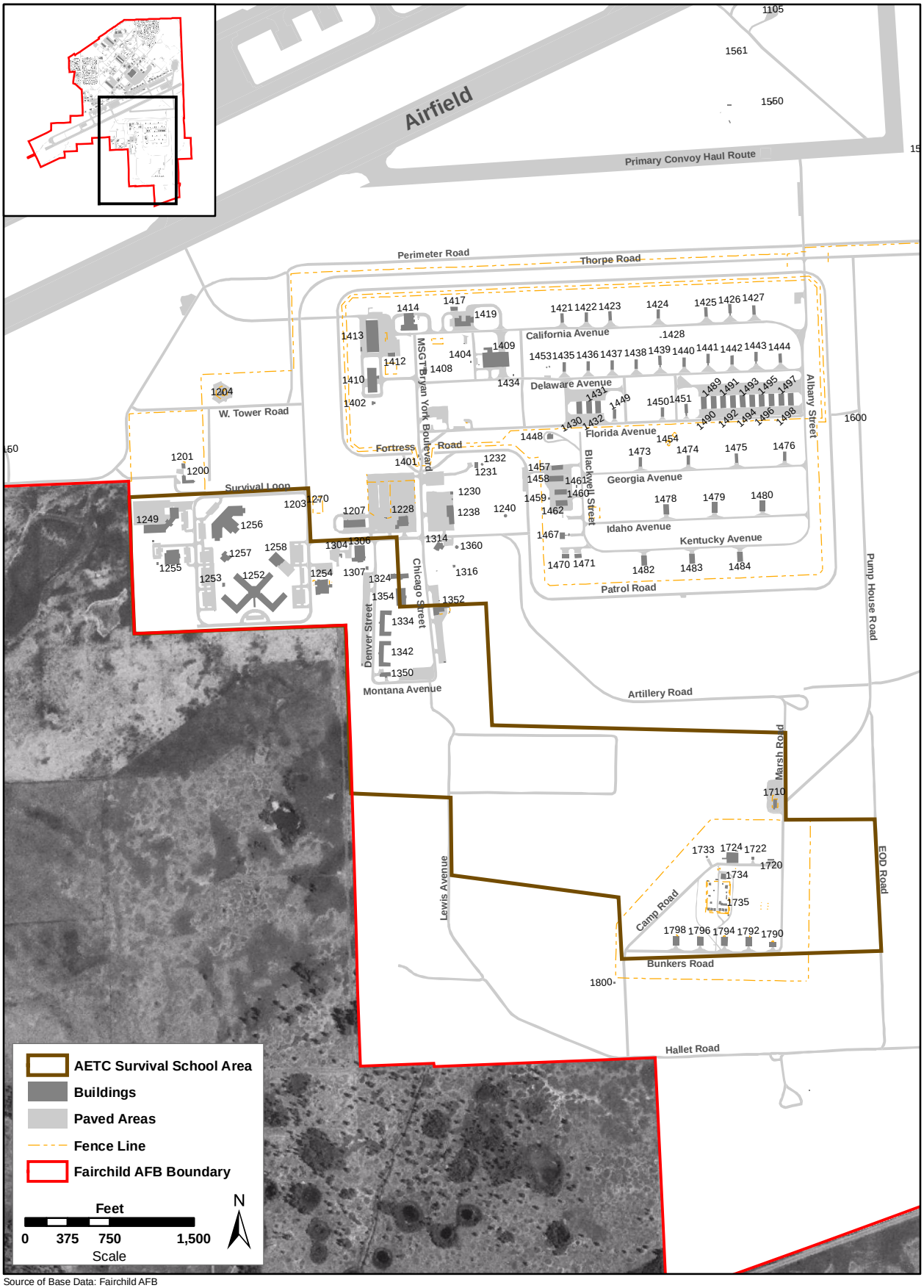
Source: ESRI StreetMap USA 2005

Figure 1-1. Locations of Fairchild AFB and JPRA, Washington



Source of Base Data: Fairchild AFB

Figure 1-2. Fairchild AFB Base Map



Source of Base Data: Fairchild AFB

Figure 1-3. Expanded View of AETC Survival School Area

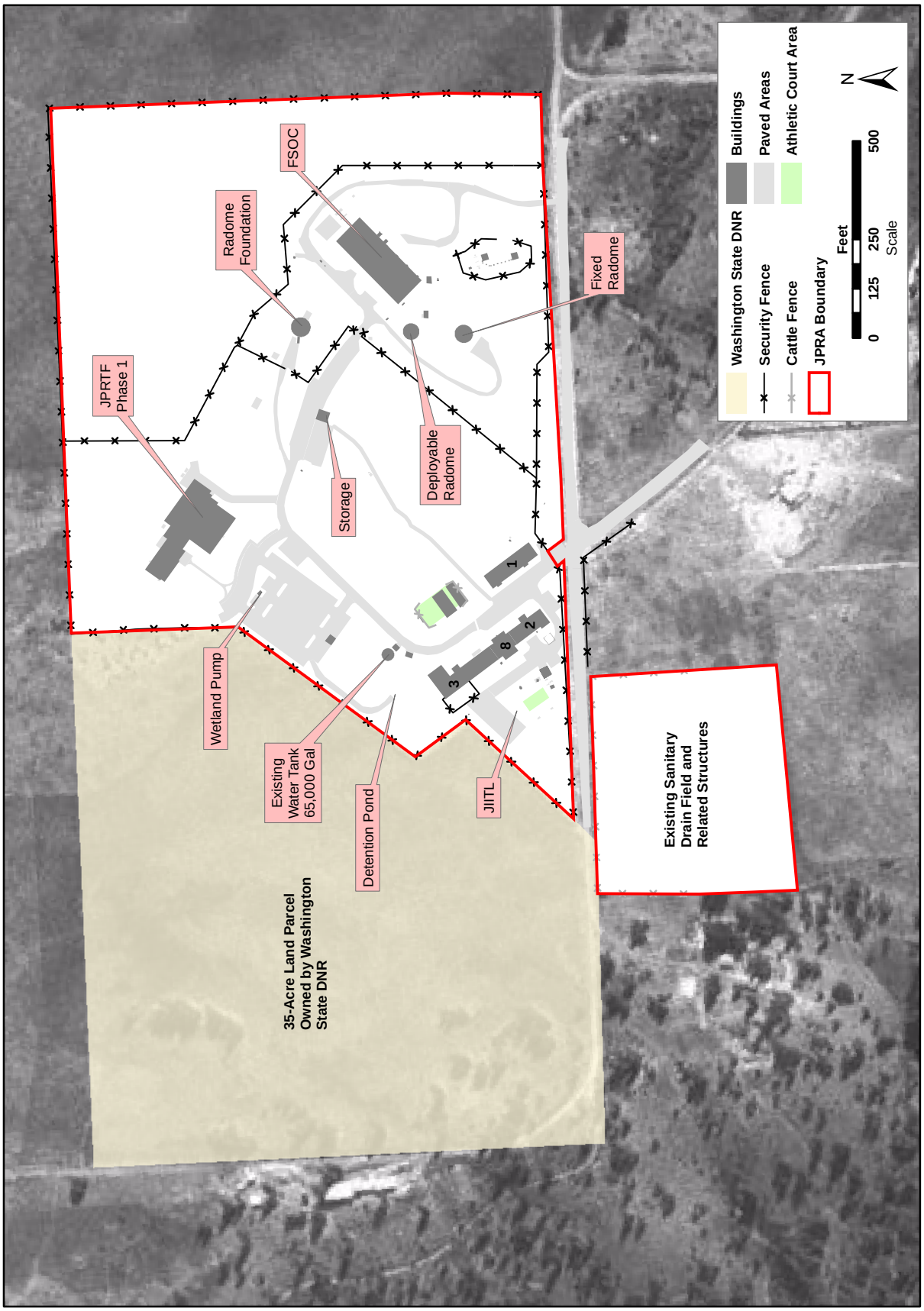


Figure 1-4. JPRA Facility Map

1.2 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to implement installation development projects on Fairchild AFB as found in the community of all existing 92 ARW-approved plans for development on the installation. The community of installation development plans is linked to individual funding programs such as Military Construction (MILCON), Operations and Maintenance (O&M), Military Family Housing (MFH), Anti-Terrorism/Force Protection (AT/FP), Nonappropriated Funds (NAF), and others. The Fairchild AFB community of plans was examined to provide a consolidated list of projects that are planned and programmed over the next 5 years for the continued physical development of the installation to support air mobility. These plans provide a road map for future development of the installation to accommodate future mission and facility requirements. These plans include projects for the installation's future facility development, transportation improvements, airfield and utility infrastructure enhancements, development constraints and opportunities, and land use relationships.

A compilation of all projects from the Fairchild AFB wing-approved community of installation development plans addressed in this IDEA is presented in **Appendix A**. Some of the projects identified in the Fairchild AFB community of installation development plans are appropriate for the application of Categorical Exclusion (CATEX) rules and are not analyzed in this IDEA.

The need for the Proposed Action is to be able to meet current and future mission requirements and national security objectives associated with Fairchild AFB. This would involve meeting ongoing mission requirements that necessitate the repair and upgrade of installation utilities, pavements, and facilities; improve the efficiency and effectiveness of forces and provide Distinguished Visitor support with capability to expand; replace older, substandard facilities with new buildings that are on a par with workplaces outside the gate; provide reliable utilities, quality housing, and an efficient transportation system to support Fairchild AFB; and prepare to accept additional missions from current Base Realignment and Closure (BRAC) actions. In addition, morale and welfare projects that are a critical part of supporting the warfighter are included. Continued development of infrastructure at Fairchild AFB must take into account future facilities construction/demolition/renovation, transportation needs, airfield alterations and enhancements, systems improvements, utilities improvements, land use planning, and development constraints and opportunities. Contributions by Fairchild AFB to national security, as well as prospects for the assignments of additional missions in the future, dictate that the installation implement planning for the next 5 years. To ensure the complete usefulness of the installation for any tasks assigned, infrastructure projects must take into account—and be capable of supporting—all functions inherent to a USAF installation. These include aircraft operations and maintenance activities, security, administration, communications, billeting, supply and storage, training, transportation, and community quality of life.

1.3 Scope of the Analysis

Fairchild AFB seeks to improve the continuing installation development process by evaluating in a single EA all actions proposed in the Fairchild AFB wing-approved community of plans for installation development. The scope of the IDEA includes an evaluation of alternatives for the various projects and analysis of the cumulative effects on the natural and man-made environments. The Proposed Action includes numerous projects, such as new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, community living upgrades, infrastructure upgrades, demolition of aging facilities, and recreational upgrades that would be completed/implemented during the next 5 years.

This IDEA evaluates the impacts of a Proposed Action that encompasses the continuing activities of demolition, construction, and infrastructure repair/improvements inherent to Fairchild AFB adapting to

ever-evolving mission requirements. This IDEA will identify, document, and evaluate the effects of all activities involved in modernizing and upgrading Fairchild AFB to meet future requirements. The IDEA will present and analyze potentially adverse direct, indirect, and cumulative environmental impacts resulting from implementation of Fairchild AFB's installation development (the Proposed Action) with emphasis on avoiding impacts on environmentally sensitive areas.

The scope of this EA includes an evaluation of the Proposed Action and No Action alternative and an analysis of the cumulative effects on the natural and man-made environments of Fairchild AFB and surrounding areas. None of the projects contained in this IDEA, as part of the Proposed Action, would impact any environmentally sensitive area such as wetlands, floodplains, endangered species sites, or cultural resources. Projects that impact such areas or other sensitive environmental or socioeconomic resources would be the subject of separate NEPA analysis.

The Proposed Action, as described in **Section 2**, contains three categories of installation development: demolition, construction (to include renovations, installations, alterations, and repairs), and infrastructure (fences, sidewalks, roads, and utility) projects. These three categories were identified for use in this document because they allow the grouping of development initiatives by generally common elements of their activity and the nature of their potential environmental impacts. Within each category, the IDEA analyzes in detail the environmental impacts resulting from the activities for a subset of representative projects that are described in **Sections 2.1.2**, **2.1.3**, and **2.1.4** ranging in size, acreage disturbed, air emissions, impervious surface increase, vegetation disturbed, and other relevant resources. The IDEA also analyzes the siting of construction activities based on environmental constraints. All other projects are analyzed in detail using the same methodology as the representative projects and their impacts summarized in tabular form in **Section 4.4.4**. The complete categorized lists of proposed projects that compose the Proposed Action can be found in **Appendix A**.

The collective analysis of all appropriate projects in a single EA will streamline the NEPA review process; eliminate project fractionation and segmentation; facilitate coordination of land use planning; reduce installation, reviewing agency, and major command (MAJCOM) workloads; provide cost savings; help better evaluate potential cumulative environmental impacts; assist in maintaining a baseline for future analysis; and meet the USAF's EIAP goals.

1.4 Summary of Key Environmental Compliance Requirements

1.4.1 National Environmental Policy Act

NEPA is a Federal law that requires the identification and analysis of potential environmental impacts resulting from proposed Federal actions before those actions are taken. This EA has been prepared in accordance with NEPA (42 United States Code [U.S.C.] 4321–4347), the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] §§ 1500–1508), and 32 CFR Part 989, et seq., Environmental Impact Analysis Process (formerly known as *Air Force Instruction[AFI] 32-7061*). CEQ regulations mandate that all Federal agencies use a systematic interdisciplinary approach to environmental planning and the evaluation of actions that might affect the environment. This process evaluates potential environmental consequences associated with a Proposed Action and considers various alternatives to the Proposed Action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states that the USAF will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is the EIAP, 32 CFR 989, as amended.

1.4.2 Integration of Other Environmental Statutes and Regulations

To demonstrate compliance with NEPA, the planning and decisionmaking process for actions proposed by the USAF and other Federal agencies involves an evaluation of the Proposed Action relative to other relevant environmental statutes and regulations. Application of the NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. It addresses them collectively in the form of an EA or Environmental Impact Statement (EIS), which enables the decisionmaker to hold a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

The IDEA examines potential effects of the Proposed Action and alternatives on 11 resource areas: noise, land use, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic and environmental justice, hazardous materials and waste management, and infrastructure. These resources were identified as being potentially affected by the Proposed Action and include applicable elements of the human environment that are prompted for review by Executive Order (EO), regulation, or policy. **Appendix B** contains examples of relevant laws, regulations, and other requirements that are often considered as part of the analysis. Where useful to better understanding, key provisions of the statutes and EOs are discussed in more detail in the text of the IDEA.

1.4.3 Interagency and Intergovernmental Coordination for Environmental Planning

One of the fundamental principles of NEPA is to provide public and agency awareness of Federal actions prior to project implementation. The premise of this principal is that the quality of Federal decisions will be enhanced if the general public and local state and Federal agencies are offered the opportunity to comment and be involved in the planning process. The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AFI 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning* (IICEP), requires the USAF to implement the IICEP process, which is used for the purpose of agency coordination and implements scoping requirements.

On June 27, 2006, AMC provided the Description of the Proposed Action and Alternatives (DOPAA) for this EA to relevant Federal, state, and local agencies for review and comment. These agencies were provided with a 30-day comment period through July 27, 2006. One response from the U.S. Fish and Wildlife Service (USFWS) was received and is included in **Appendix C**.

1.5 Organization of this Document

This EA is organized into seven sections. **Sections 1 and 2** contain the DOPAA. **Section 3** contains general descriptions of biophysical resources and baseline conditions that potentially could be affected by implementation of the Proposed Action, alternatives to the Proposed Action, or the No Action Alternative. **Section 4** presents an analysis of the environmental consequences for the range of activities (demolition, construction, and infrastructure upgrades) covering future installation development. **Section 5** includes an analysis of the potential cumulative impacts on Fairchild AFB. **Section 6** is the list of preparers and **Section 7** lists the sources of information used in the preparation of the document.

Appendix A presents the list of proposed Fairchild AFB installation development projects. **Appendix B** includes descriptions of applicable laws, regulations, policies, and planning criteria. **Appendix C** includes a copy of the IICEP letter mailed to the agencies for this action, the IICEP distribution list, and responses to the IICEP letter. **Appendix D** contains a sample air emissions calculation spreadsheet to show the methodology used for all projects.

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2. Description of the Proposed Action and Alternatives

This section presents information on the Proposed Action related to the implementation of installation development as described in the Fairchild AFB wing-approved installation development plans. **Section 2.1** describes the Proposed Action at Fairchild AFB. **Section 2.2** identifies alternatives to the Proposed Action, including the No Action Alternative. **Section 2.3** identifies the decision to be made and the Preferred Alternative.

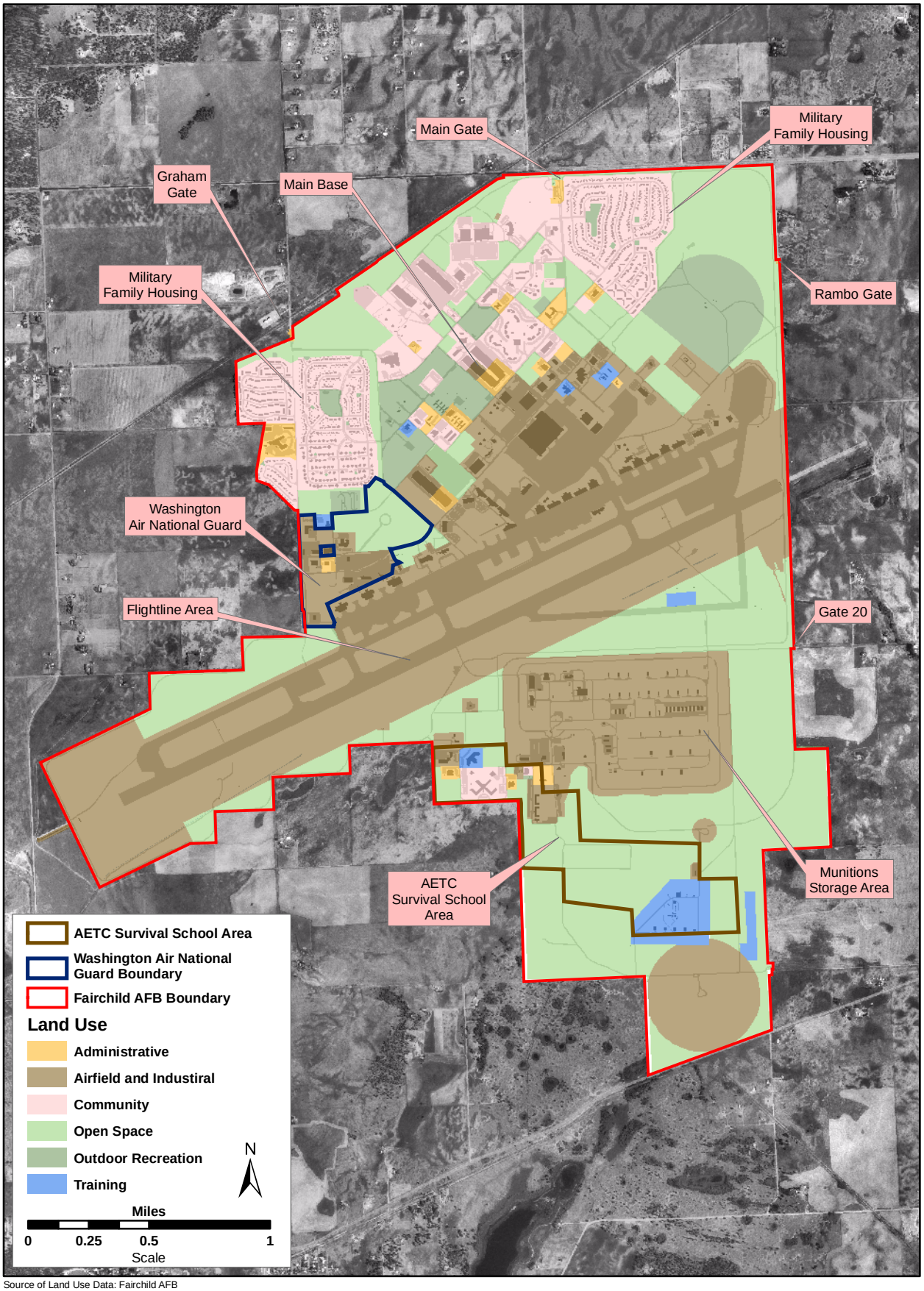
2.1 Proposed Action

The Proposed Action is to implement continuing installation development actions as found in the community of all existing approved development plans for Fairchild AFB. This action would enable Fairchild AFB to meet installation development requirements and therefore ensure readiness for future national defense missions. The Proposed Action consists of 40 projects related to installation development. It is intended that the projects contained in this IDEA will be reviewed on a 5-year rotational basis and this document could be updated or resubmitted to accommodate substantive change. If during the course of these 5 years any of the projects listed in **Appendix A** change substantively, the project could be excluded from the IDEA without affecting other projects originally included in the IDEA.

The projects included as the Proposed Action have been organized into three categories (demolition, construction, and infrastructure upgrade). For the purposes of describing the specific types of projects included as the Proposed Action, representative projects from each of the categories are listed in **Sections 2.1.2**, **2.1.3**, and **2.1.4**. These representative projects provide examples of the various types of projects within each category, however, the total suite of projects that make up the Proposed Action is listed in **Appendix A** and evaluated in **Section 4**. The total potential impacts associated with implementation of each of the projects in **Appendix A** will be evaluated in this EA. Implementation of the Proposed Action would allow Fairchild AFB to properly plan for their future planning and budgeting cycles and ensure their readiness for future national defense and homeland security requirements.

This IDEA will be prepared using a constraints-based EIAP (**Section 2.1.1**). This approach will enable a comprehensive evaluation of environmental concerns throughout the base and also those concerns unique to specific areas of Fairchild AFB. This analysis will utilize the information obtained from extensive recent EIAP evaluations for similar types of projects to determine the direct, indirect, and cumulative impacts of projects that would be completed as part of the installation's development plan.

All construction would comply with fire and safety codes. The proposed construction projects would be implemented using sustainable design concepts. Sustainable design concepts emphasize state-of-the-art strategies for site development, efficient water and energy use, and improved indoor environmental quality. Each project would be sited in a manner compatible with Fairchild AFB's land use categories and with minimal impact on sensitive constrained land use areas. Land use categories at Fairchild AFB have been grouped into Areas of Development (AOD) for the planning purposes of the IDEA. The AOD categories are Administrative, Medical, Outdoor Recreation, Open Space, Water, Airfield and Industrial, and Community. The Airfield and Industrial AOD includes the Airfield, Aircraft Operations and Maintenance, Training, and Industrial land use categories and the Community AOD includes the Community Commercial, Community Services, Housing Accompanied, Housing Unaccompanied, and Temporary Lodging land use categories. **Figure 2-1** represents the Fairchild AFB Land Use Categories used in this IDEA.



Source of Land Use Data: Fairchild AFB

Figure 2-1. Fairchild AFB Land Use Map

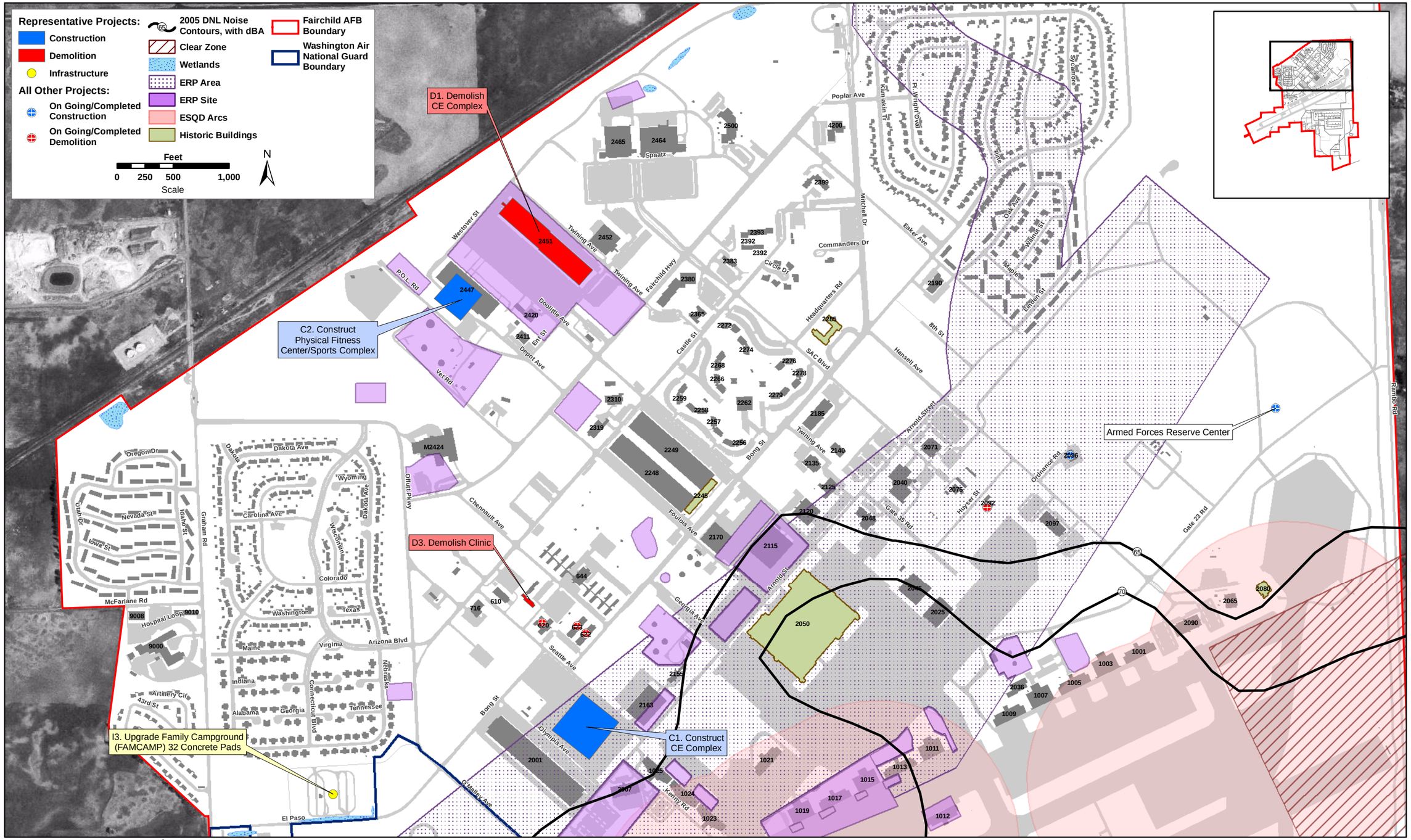
The exterior and interior design of the new and renovated facilities would follow the design guidelines outlined in the *Air Mobility Command Civil Engineering Squadron Design Guide* and the *Fairchild AFB Architectural Compatibility Design Plan.* Adherence to these standards would maintain a consistent and coherent architectural character throughout Fairchild AFB. Landscaping in the form of berms, plants, shrubs, and trees, would be used not only to enhance the professional architectural character and blend the buildings with the surrounding environment but also for AT/FP purposes. AT/FP measures would be incorporated in accordance with the *USAF Installation Force Protection Guide*.

All projects identified as part of the Proposed Action in this IDEA would avoid floodplains, wetlands, threatened or endangered species, and cultural resources. Proposed locations of each representative project in relation to environmental constraints at Fairchild AFB are shown in **Figures 2-2** and **2-3**. **Figure 2-4** shows the locations of projects in relation to environmental constraints at JPRA. The precise layout and design of these projects is in the early planning stages and, therefore, exact surveyed locations and layouts are not finalized. Should locations and final layout of the projects differ substantially from those anticipated (in location, layout, or potential environmental consequences), additional environmental analysis would be completed. If it is determined that future projects outside the scope of this IDEA would impact sensitive resources, separate environmental analysis would be required.

2.1.1 Major Installation Constraints

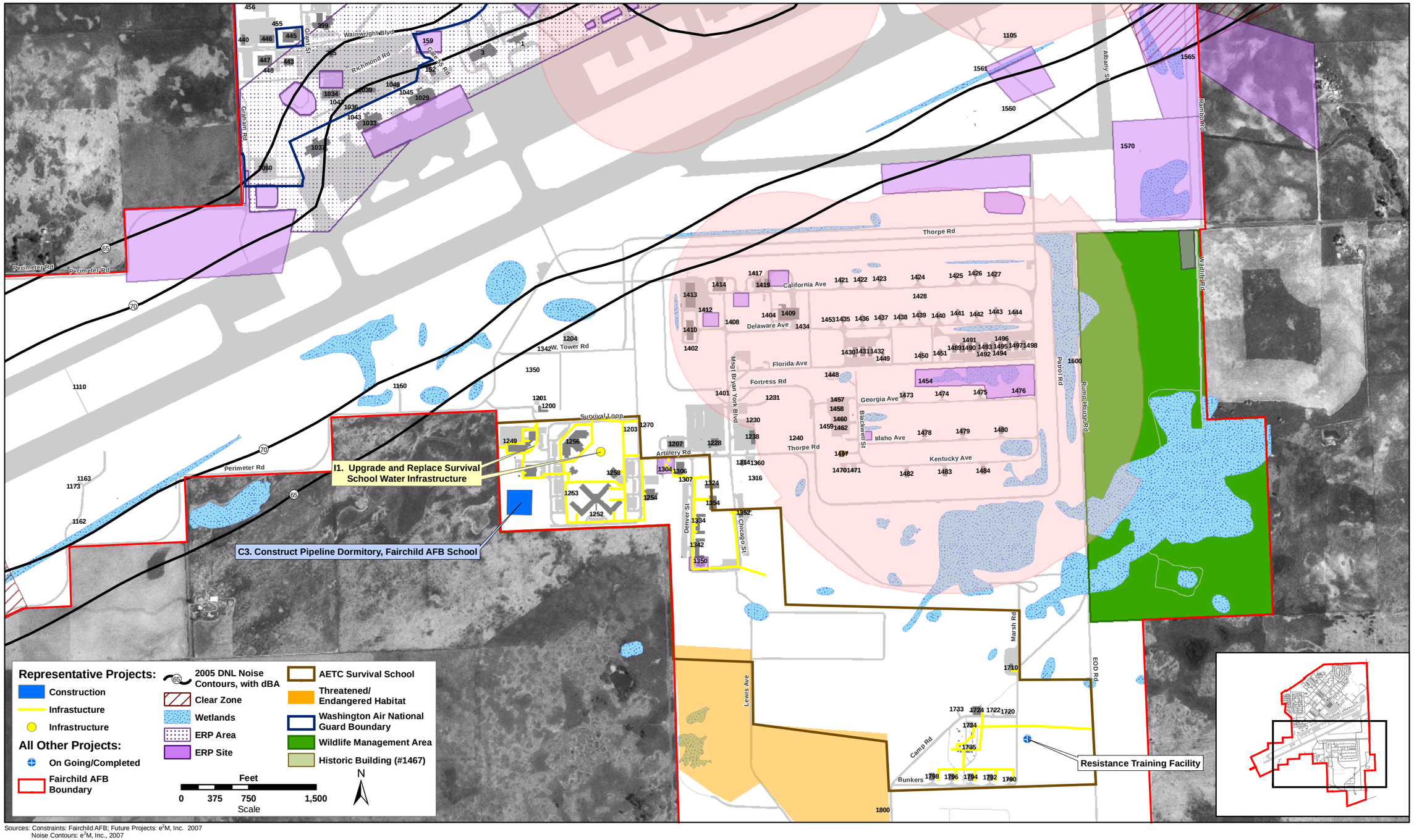
There are a number of land use, regulatory, and mission-related constraints within the boundaries of Fairchild AFB that will influence and could limit future development at the installation. The major constraints on Fairchild AFB, including the AETC Survival School and JPRA, are listed below and depicted in **Figure 2-3**. Some constraint areas overlap and therefore the acreages listed below do not add up to the actual total acreage of Fairchild AFB.

- ***Airfield Infrastructure, Clear Zones, and Imaginary Surfaces (2,024 acres).*** These areas would only allow airfield improvements and projects directly associated with airfield operations. All projects within this area must be approved by the Facility Utilization Board (FUB) and airfield management prior to commencing any construction-related activities.
- ***Wetlands (174 acres).*** It is USAF policy not to construct new facilities within the areas containing wetlands where practicable. To construct within areas containing wetlands, appropriate permits from county, state, and Federal regulatory agencies must be obtained. In addition, in accordance with EO 11990, a Finding of No Practicable Alternative (FONPA) must be prepared and approved by HQ AMC.
- ***Threatened and Endangered Species and Associated Habitats (71 acres).*** There are a number of known threatened and endangered (T&E) plant species and their associated habitats on Fairchild AFB. Construction within T&E habitat must be approved by the USFWS and 92 Environmental Flight (92 CES/CEV). In addition, a USFWS Section 7 Biological Opinion, as required under the Endangered Species Act (ESA) of 1973, must be obtained prior to commencing construction activities within these areas.
- ***Cultural Resources, Historic Buildings, and Archeological Sites.*** There are a number of known prehistoric and historic archeological sites and historic buildings on Fairchild AFB. Identified in the Fairchild AFB Integrated Cultural Resources Management Plan (ICRMP) are six archeological sites, and five historic buildings. **Figures 2-2** and **2-3** show the locations of the historic buildings (Buildings 1467, 2050, 2080, 2245, and 2285). Construction within or demolition of cultural resources sites must be coordinated with the State Historic Preservation Office (SHPO), FUB, and 92 Civil Engineering (92 CE). There are no historic buildings at JPRA.



Sources: Constraints: Fairchild AFB; Future Projects: e^{2}M, Inc. 2007
Noise Contours: e^{2}M, Inc., 2007

Figure 2-2. Fairchild AFB Constraints Map (Northern Portion of Installation)



Sources: Constraints: Fairchild AFB; Future Projects: e²M, Inc. 2007
Noise Contours: e²M, Inc., 2007

Figure 2-3. Fairchild AFB Constraints Map (Southern Portion of Installation)

- ***Environmental Restoration Program (ERP) Sites and ERP Area (712 acres).*** Fairchild AFB contains 39 ERP sites and Areas of Concern and five Resource Conservation and Recovery Act (RCRA) sites. New facilities may be constructed within certain ERP sites depending on the level of contamination, clean-up efforts, and land use constraints (LUCs). Approval of new construction within ERP sites must be obtained by FUB and coordinated with 92 CE.
- ***Explosive Safety Quantity Distance (ESQD) arcs.*** There are several areas that are constrained by ESQD clear zones at Fairchild AFB including the alert area, Explosive Combat Aircraft parking, and the Munitions Storage Area (see **Figure 2-2** and **2-3**).

There are a number of land use, regulatory, and mission-related constraints within the boundaries of JPRA that could limit future development. Lack of available land for development is the major constraint on the JPRA (**Figure 2-4**). Lack of land is attributed to natural topography and AT/FP setback requirements.

- ***Natural Topography.*** There are a number of basalt rock outcroppings within the JPRA facility. A setback of 50 feet is required around each basalt rock outcropping. These outcroppings and setbacks limit 38.1 acres from potential future development.
- ***AT/FP Setback Requirements.*** Approximately 35 acres of the JPRA facility is inside AT/FP boundary and road setbacks. A setback of 150 feet is required from the JPRA perimeter security fence line, which is set in 6 feet from the JPRA boundary. A setback of 85 feet is required from each roadway within the JPRA. Buildings 1, 2, and 8 are within this AT/FP setback area.

The JPRA is currently in negotiations with the State of Washington Department of Natural Resources (DNR) to acquire 35 acres of DNR land immediately west of the JPRA-West White Bluff facility for future expansion. Most of the proposed JPRA Master Plan projects cannot occur without acquiring this DNR land.

As a general practice, Fairchild AFB and the JPRA seek to avoid, where possible, disturbance activities in floodplains, wetlands, areas where sensitive species nest, acreage designated as critical habitat, and areas designated as historic or culturally sensitive. When these resources will be impacted, installation personnel will implement appropriate mitigation measures in coordination with the regulatory agencies.

2.1.2 Demolition Projects

Fairchild AFB proposes 8 facility demolition projects for the next 5 years (**Appendix A**) to support its future mission requirements. These facilities have been deemed too costly to repair or renovate to meet the future mission needs of Fairchild AFB. **Table 2-1** identifies projects that would be representative of the types of demolition projects proposed. These demolition projects have been selected for further analysis because they would affect the largest square footage and therefore would have the highest potential of impacts on the natural and man-made environments. Therefore, these projects are representative of the upper limit for potential impacts that reasonably could be expected from the other projects in the demolition projects category. The proposed locations for these projects in relation to constraints are shown in **Figures 2-2** and **2-4**.

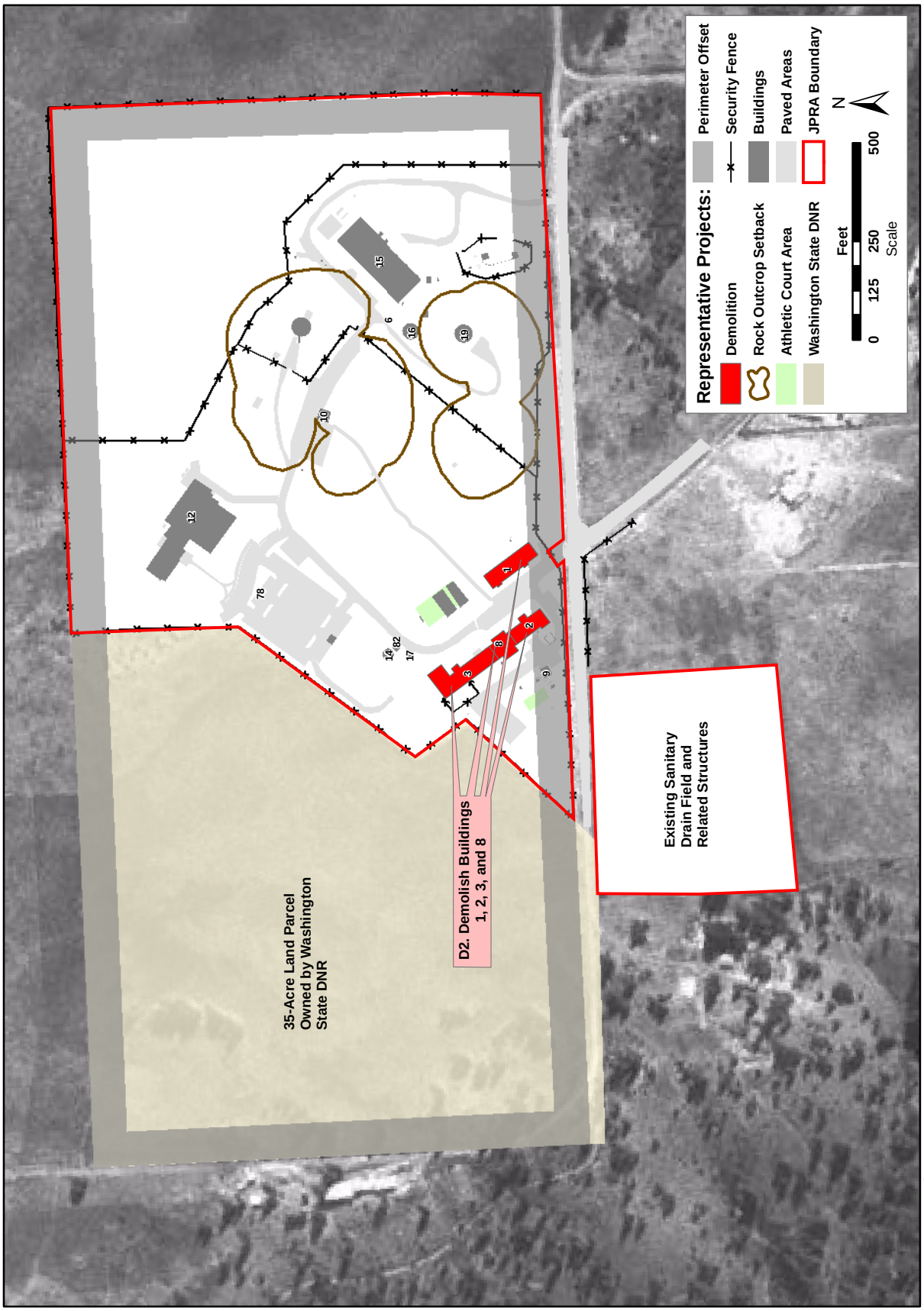


Figure 2-4. JPRA Constraints Map

Table 2-1. Representative Demolition Projects

Project Title	Year Proposed	Area Demolished (ft^2)
D1. Civil Engineering (CE) Complex	2008	173,443
D2. Buildings 1, 2, 3, and 8	2011	100,000
D3. Clinic	2007	50,000

2.1.3 Construction Projects

Fairchild AFB proposes 28 facility construction, renovation, repairs, and alteration projects over the next 5 years (**Appendix A**) to support its future mission requirements and to comply with force protection criteria. These construction projects have been selected for further analysis because they would affect the largest square footage and therefore would have the highest potential of impacts on the natural and man-made environments. Therefore, these projects are representative of the upper limit for potential impacts that reasonably could be expected from the other projects in the demolition projects category. **Table 2-2** identifies projects that would be representative of the type of construction projects proposed. The proposed locations for these projects in relation to constraints are shown in **Figures 2-2** and **2-3**.

Table 2-2. Representative Construction Projects

Project Title	Year Proposed	Area Constructed (ft^2)
C1. CE Complex	2006	184,000
C2. Physical Fitness Center/Sports Complex	2008	96,000
C3. Pipeline Dormitory	2010	82,000

2.1.4 Infrastructure Projects

Fairchild AFB proposes 4 facility infrastructure projects over the next 5 years (**Appendix A**) to support future mission requirements and to comply with force protection requirements. Facility infrastructure projects include installation or upgrades to paved roadways, sidewalks, parking lots, utilities, recreation, and fences to improve the installation infrastructure capacity to meet the demands of the future. These construction projects are listed in this section and analyzed in detail in **Section 4.0** as examples of the type of installation development projects that are scheduled to occur over the next 5 years at Fairchild AFB. The upgrade to the Fairchild AFB water system would have the potential to create the greatest impacts and surface disturbance to wetlands of any of the listed infrastructure projects in **Appendix A**. The improvements in infrastructure projects would result in 88,450 linear feet of new and repaired utility systems. **Table 2-3** identifies projects that would be representative of the type of infrastructure projects proposed. The proposed locations for these projects in relation to constraints are shown in **Figure 2-2** and **2-3**. These facility infrastructure projects have been selected for further analysis because they would affect the largest square footage and therefore would have the highest potential of impacts on the natural and man-made environments. Therefore, these projects are representative of the upper limit for potential impacts that reasonably could be expected from the other projects in the facility infrastructure projects category.

Table 2-3. Representative Infrastructure Projects

Project Title	Year Proposed	Project Size (linear feet)
I1. Upgrade and Replace AETC Survival School Water Infrastructure	2006	14,458
I2. Upgrade Water System Between the Wells and Main Base	2009	63,000
I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads	2009	28,000

2.1.5 Summary of Proposed Activities

As a result of the Proposed Action, there would be approximately 423,000 square feet (ft^2) of building footprint demolished, resulting in a decrease of impervious surface of approximately 423,000 ft^2. Over the course of the next 5 years, there would be approximately 885,500 ft^2 of new facilities developed resulting in an anticipated increase of 756,000 ft^2 of impervious surface (some of the facilities would be multiple levels). Additionally, there would be approximately 77,450 linear feet and 28,000 ft^2 of infrastructure improvements that would result with implementation of the Proposed Action. The majority of these improvements would not increase impervious surface, but would simply result in short-term surficial disturbance. **Table 2-4** summarizes the anticipated changes.

Table 2-4. Change in Impervious Surface

Project Type	Total Area (ft^2)	Change in Impervious Surface [a]
Demolition	422,769	-422,769 ft^2
Construction	885,500	+756,000 ft^2
Infrastructure	77,450 linear feet/ 28,000 ft^2	+28,000 ft^2
	Total	**+361,231 ft^2**

Note: [a] Change in impervious surface is not necessarily equivalent to the total square footage because some new facilities are multiple levels, and some projects (infrastructure, in particular) do not increase impervious surface.

2.2 Alternatives

During development of the Fairchild AFB installation development plans and during the project siting phase, alternative locations for the construction and infrastructure projects were evaluated and the best possible solution for project siting was selected based on numerous criteria (e.g., collocation of like services, availability of site). Based on this evaluation, the proposed locations for each of the construction and infrastructure projects were determined to be optimal (**Figures 2-1** and **2-2**). With respect to alternatives for the demolition projects, each of these were also evaluated for potential reuse options and none were considered suitable for reuse. The Proposed Action and the No Action Alternative will therefore be carried forward throughout this document.

Upon completion of the IDEA, any subset of the included projects could be implemented based upon availability of funding. All of the IDEA projects are evaluated individually and cumulatively in this EA to determine if the consequences of implementation would cause substantive impacts on the human and

natural environments of Fairchild AFB and surrounding areas. Subsets of projects, as alternatives, were not carried forward for further independent analysis based on the determination that subsets would not cause any additional impacts beyond that of the Proposed Action.

The individual projects would be prioritized and implemented as funding becomes available. The Proposed Action encompasses all the current priority projects and the analysis describes the specific and cumulative consequences of implementing the IDEA plan. Since project phasing is expected to occur, based on availability of funding, no phasing alternatives were carried forward for independent analysis.

2.2.1 Alternative 1 – Acquire Additional Land Surrounding Fairchild AFB

Under this alternative, Fairchild AFB would purchase land outside its present boundaries to construct some of the facilities it needs for future mission requirements. The Department of Defense (DOD) discourages installations from acquiring more land purchases. In fact, the DOD is attempting to dispose of many acres of underutilized land at several installations in the United States.

Fairchild AFB is a highly developed, mature installation, yet has numerous opportunities for development within designated land use areas. There are approximately 600 acres of developable open space on Fairchild AFB. Other opportunities involve redevelopment of sites where existing structures could be demolished or infill development on parcels surrounded by existing uses. In addition, open space/farmland surrounds Fairchild AFB, should the requirement arise to acquire additional property. Because there is so much land available for development on Fairchild AFB, this alternative is not considered viable and is eliminated from further analysis in the IDEA.

2.2.2 Alternative 2 – Lease Additional Facilities in the Surrounding Community

Under this alternative, Fairchild AFB would lease office and warehouse space in the surrounding community to house personnel and provide space for mission operations. This alternative would result in an insufficient span of control for the command and control function. The leased facilities would have to meet the DOD force protection requirements resulting in additional costs. This alternative is not considered viable and is eliminated from further analysis in the IDEA.

2.2.3 No Action Alternative

Under the No Action Alternative, the 92 ARW would not implement the projects proposed in the installation's community of plans. In general, implementation of the No Action Alternative would require that the 92 ARW continue to operate under substandard, inefficient, and, in some cases, unsafe conditions. Under the No Action Alternative, these deficiencies would impair the 92 ARW's future ability to successfully conduct their mission.

Through implementation of the No Action Alternative, future installation development would continue to be evaluated for potential impacts on an individual piecemeal basis. The preparation of individual NEPA documents would be time-consuming, costly, and would not facilitate future comprehensive land use planning or effective cumulative effects analyses, or effectual conservation of resources. This alternative will be carried forward for analysis as a baseline against which the impacts of the Proposed Action and alternatives can be evaluated.

2.3 Decision to be Made and Identification of the Preferred Alternative

Upon completion of the EA, Fairchild AFB would determine whether implementation of the Proposed Action would result in any significant impacts. If, upon completion of this EA, it is determined that implementation of the Proposed Action would result in significant impacts, Fairchild AFB would develop various mitigation measures to reduce impacts to below the level of significance, initiate the preparation of an EIS, or abandon the Proposed Action. This EA will also be used to guide Fairchild AFB in implementing the Proposed Action in a manner consistent with the USAF standards for environmental stewardship. The Preferred Alternative for the Proposed Action is set forth in **Section 2.1**.

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3. Affected Environment

Section 3 describes the environmental resources and conditions most likely to be affected by the Proposed Action and provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action. Baseline conditions represent current conditions. The potential environmental impacts of the Proposed Action and the No Action Alternative on the baseline conditions are described in **Section 4**. In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, as amended, the description of the affected environment focuses on those resources and conditions potentially subject to impacts.

3.1 Noise

3.1.1 Definition of the Resource

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to increased noise levels varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day.

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (dBA) are used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted.

Noise levels used to characterize community noise effects from such activities as aircraft or building construction are measured in the Day-Night Average A-weighted Sound Level (DNL). This noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Noise levels in residential areas vary depending on the housing density and location. As shown in **Figure 3-1**, a normal suburban area is about 55 dBA, which increases to 60 dBA for an urban residential area and 80 dBA in the downtown section of a city.

3.1.2 Existing Conditions

Ambient Noise Environment. Fairchild AFB is on the eastern side of the state of Washington about 15 miles west from the city of Spokane. There are two relatively small incorporated areas near Fairchild AFB: Medical Lake and Airway Heights. Medical Lake, which is approximately 2.5 miles south of Fairchild AFB, has a population of 3,758. Airway Heights, which is approximately 1.5 miles east of the installation, has a population of 4,500. Most of the land surrounding Fairchild AFB is categorized as vacant or agricultural. Noise sensitive land is north of the installation in residential sections and around Medical Lake and Airway Heights.

Transportation routes near Fairchild AFB include Interstate 90, U.S. Route 2, and State Route 902. Interstate 90 is 3 miles southeast of Fairchild AFB and runs southwest and northeast to the city of Spokane. U.S. Route 2 traverses west and east on the northern border of Fairchild AFB. State Route 902 borders the southern end of Fairchild AFB and accesses Medical Lake. Considering the relatively rural land use and small cities adjacent to Fairchild AFB, vehicle traffic noise is not likely a significant issue with the possible exception of residential areas adjacent to Interstate 90.

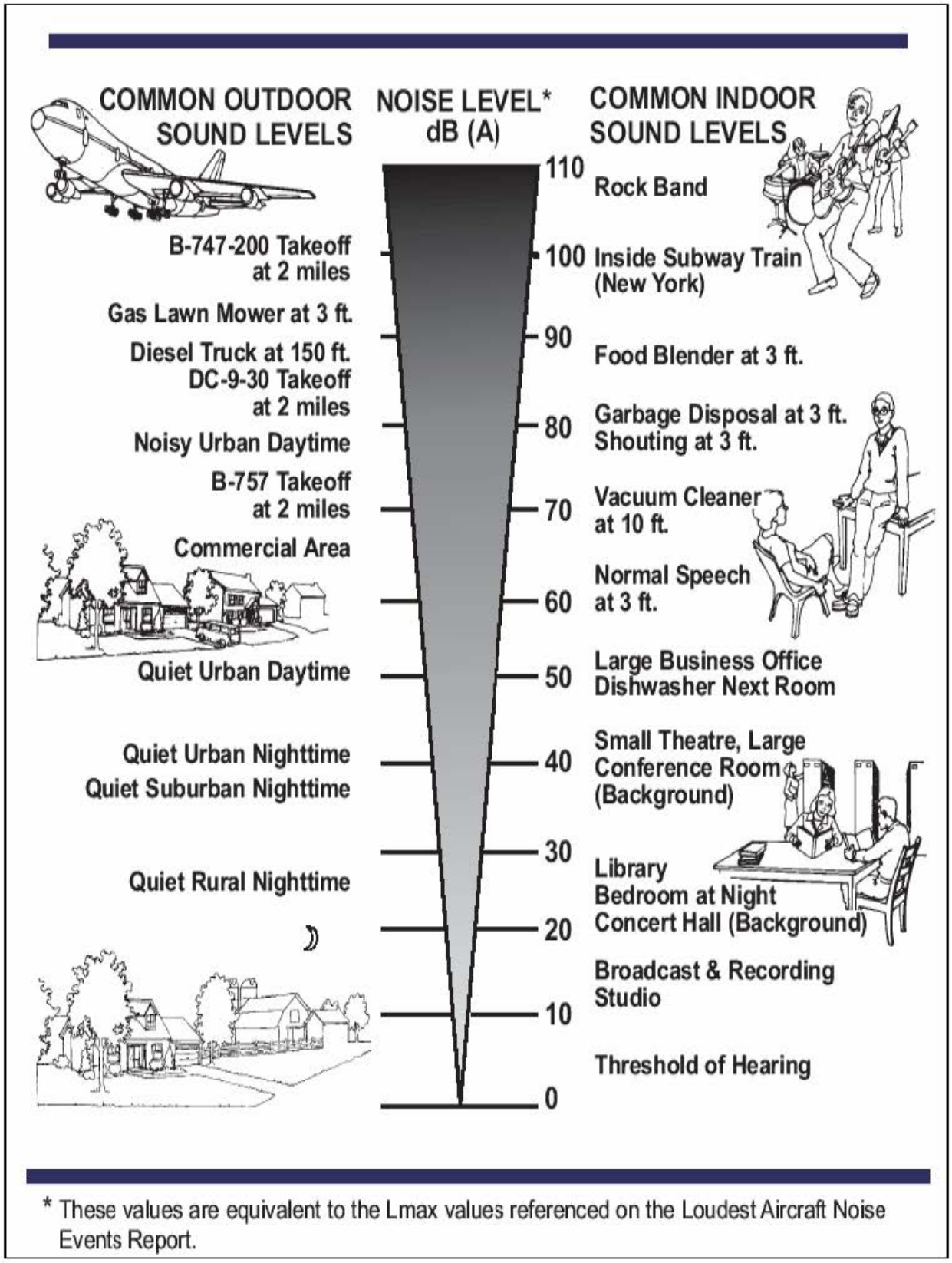


Figure 3-1. Typical Noise Levels

Spokane International Airport is approximately 5 miles east of Fairchild AFB. Fairchild AFB and Spokane International Airport have similar flight paths which are oriented northeast and southwest. As a result, it is likely that residents southwest and northeast of Fairchild AFB and Spokane International Airport are impacted by aircraft operations. The *Fairchild AFB Air Installation Compatible Use Zone Study, 2005* shows that some sections of southern Airway Heights are subject to increased noise levels from aircraft operations at Fairchild AFB.

With the exception of increased aircraft noise in some areas adjacent to Fairchild AFB and Spokane International Airport, the ambient environment around Fairchild AFB is likely to be relatively low. The land use in the region indicates that the noise level would fall into the category of a small town or quiet suburban area of approximately 50 dBA, as shown on **Figure 3-1**.

Table 3-1. Predicted Noise Levels for Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 feet (dBA)
Grading	
Bulldozer	87
Grader	85
Water Truck	88
Paving	
Paver	89
Roller	74
Demolition	
Loader	85
Haul Truck	88
Backhoe	83
Building Construction	
Generator Saw	81
Industrial Saw	83
Welder	74
Truck	80
Forklift	67
Crane	83

Source: COL 2001

3.2 Land Use

3.2.1 Definition of the Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for

describing land use categories. As a result, the meanings of various land use descriptions, "labels," and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

In the context of aircraft operations, land use compatibility is also described in the context of noise levels. A DNL of 65 dB is useful to recognize as a level that, when exceeded, is normally not compatible with residential land use. Noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or sustaining road and building construction activity and are measured in the DNL. This noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10-dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging sound exposure level values for a given 24-hour period. DNL is the preferred noise metric of the U.S. Department of Housing and Urban Development (HUD), the Federal Aviation Administration (FAA), the U.S. Environmental Protection Agency (USEPA), and DOD for modeling airport environs.

Most people are exposed to sound levels of DNL 50 to 55 dBA or higher on a daily basis. Noise levels in residential areas vary depending on the housing density and location. As shown on **Table 3-1**, a normal suburban area is about 55 dBA, which increases to 60 dBA for an urban residential area and 80 dBA in the downtown section of a city.

3.2.2 Existing Conditions

Fairchild AFB is about 15 miles west of the city of Spokane in western Spokane County. Land use on the installation consists of airfield and industrial areas, community facilities, training areas, and outdoor and recreation facilities. Airfield and open space land uses compose more than 50 percent of the installation's acreage.

Airfield facilities at Fairchild AFB include hangars, maintenance shops, the control tower, and fire station-crash/rescue facilities in addition to the runway and taxiway areas. Fairchild AFB has easements on privately owned land at the end of the runways in the Clear Zones to protect against incompatible uses. Industrial land use consists of a jet fuel tank farm, warehouses, civil engineering facilities, a kennel, vehicle operations, and a large munitions storage area. There are numerous community service facilities on the installation including an elementary school, library, child care center, chapel, and a professional development center, in addition to a medical complex on the west side of the installation. Open space areas are mainly in the northeastern corner, adjacent to the family housing area, and in the southern

portion of the installation adjacent to the AETC Survival School and Munitions Storage Area complexes. Fairchild AFB also owns a recreation area at Clear Lake, 10 miles southwest of the installation.

Incorporated areas around Fairchild AFB include Medical Lake, Airway Heights, and the City of Spokane. Medical Lake is approximately 2.5 miles south of Fairchild AFB and consists mainly of residential, agricultural, open space, and public land uses. Most of the residential and commercial property is in the northeastern portion of the city, while the state institutions lie to the west and southwest. The noise analysis from the *Fairchild AFB Air Installation Compatible Use Zone Study, 2005* does not show elevated noise levels in Medical Lake as a result of aircraft operations at Fairchild AFB. However, land use and development issues within its jurisdiction are important due to the community's proximity to the installation and because development is expanding on the north side of the community towards the installation.

Airway Heights is approximately 1.5 miles east of Fairchild AFB. Land use throughout the southern half of Airway Heights, closest to the installation, includes residential, industrial, and open space. This area is subject to elevated noise levels from aircraft operations at Fairchild AFB. The remaining section of Airway Heights consists mostly of residential, tribal, commercial, public, and open space and is not significantly impacted by aircraft noise from Fairchild AFB.

The city of Spokane is the largest city in Spokane County and is about 15 miles east of Fairchild AFB. Spokane is considered to be the regional economic hub for the Inland Northwest (U.S. Bureau of Census 2002) and contains a mix of urban land uses. Aircraft operations from Fairchild AFB do not significantly impact the populations in the city of Spokane.

The land surrounding Fairchild AFB that does not lie within the adjacent municipalities is under Spokane County's jurisdiction. The majority of the land to the north, west, and southeast of the installation consists mostly of agricultural uses but over time is being subdivided into rural and suburban residential uses. Most residential parcels are 3 to 20 acres in size. Light industrial, which includes a gravel operation and warehouses, is the main land use to the east of the installation. Less than 2 miles east of Fairchild AFB, Spokane International Airport owns a large parcel of land, much of which is in use by the airport (USAF 1995).

3.3 Air Quality

3.3.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm), milligrams per cubic meter (mg/m^3), or micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and particulate matter equal to or less than 2.5 microns in diameter

[$PM_{2.5}$]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards. **Table 3-2** presents the primary and secondary USEPA NAAQS (USEPA 2004a).

Table 3-2. National Ambient Air Quality Standards

Pollutant	Standard Value		Standard Type
CO			
8-hour Average [a]	9 ppm	(10 mg/m^3)	Primary and Secondary
1-hour Average [a]	35 ppm	(40 mg/m^3)	Primary
NO_2			
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	Primary and Secondary
O_3			
8-hour Average [b]	0.08 ppm	(157 µg/m^3)	Primary and Secondary
1-hour Average [c]	0.12 ppm	(240 µg/m^3)	Primary and Secondary
Pb			
Quarterly Average		1.5 µg/m^3	Primary and Secondary
PM_{10}			
Annual Arithmetic Mean [d]		50 µg/m^3	Primary and Secondary
24-hour Average [a]		150 µg/m^3	Primary and Secondary
$PM_{2.5}$			
Annual Arithmetic Mean [e]		15 µg/m^3	Primary and Secondary
24-hour Average [f]		65 µg/m^3	Primary and Secondary
SO_2			
Annual Arithmetic Mean	0.03 ppm	(80 µg/m^3)	Primary
24-hour Average [a]	0.14 ppm	(365 µg/m^3)	Primary
3-hour Average [a]	0.5 ppm	(1,300 µg/m^3)	Secondary

Source: USEPA 2006

Notes: Parenthetical values are approximate equivalent concentrations.

[a] Not to be exceeded more than once per year.

[b] To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

[c] (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. (b) As of June 15, 2005, USEPA revoked the 1-hour ozone standard in all areas except the 14 8-hour ozone nonattainment Early Action Compact Areas.

[d] To attain this standard, the expected annual arithmetic mean PM_{10} concentration at each monitor within an area must not exceed 50 µg/m^3.

[e] To attain this standard, the 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.

[f] To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 65 µg/m^3.

Although O_3 is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because O_3 is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "O_3 precursors." These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies attempt to limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_2.

As authorized by the CAA, USEPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour O_3, $PM_{2.5}$, and regional haze standards that were promulgated in that year. The 1-hour O_3 standard will no longer apply to an area 1 year after the effective date of the designation of that area for the 8-hour O_3 NAAQS. The effective designation date for most areas was June 15, 2004. USEPA designated $PM_{2.5}$ nonattainment areas in December 2004, and finalized the $PM_{2.5}$ implementation rule in January 2005. No area in the state of Washington was identified as being nonattainment for the $PM_{2.5}$ standard.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, installation, or activity) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if (1) a proposed project is within 10 kilometers of any Class I area, and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more [40 CFR 52.21(b)(23)(iii)]. PSD regulations also define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III [40 CFR 52.21(c)]. Because Fairchild AFB is not within 10 kilometers of a Class I area, PSD regulations do not apply and are not discussed further in this EA.

3.3.2 Existing Conditions

Spokane County is within the Eastern Washington-Northern Idaho Interstate (EWNII) Air Quality Control Region (AQCR). The EWNII AQCR consists of the counties of Adams, Asotin, Columbia, Garfield, Grant, Lincoln, Spokane, and Whitman, Washington; and Benewah, Kootenai, Latah, Nez Perce, and Shoshone, Idaho. Portions of Spokane County, which include the Spokane Urban Area as defined by the Washington Department of Transportation, are designated as maintenance areas for CO. Spokane County is classified as being in attainment with all criteria pollutants (USEPA 2004b).

The Washington State Department of Ecology (WDOE) is responsible for implementation of the CAA and has adopted the Federal primary and secondary NAAQS. WDOE has developed an USEPA-approved SIP. The State of Washington submitted a CO Attainment Plan to USEPA in January 1993. USEPA approved the CO Attainment Plan in September 1997. The plan relies on control strategies for

tracking vehicle miles traveled; vehicle emissions inspection and maintenance programs; oxygenated fuels; transportation conformity; and reasonably available control measures for residential wood combustion, point sources, and new source review (USEPA 2004c). The State of Washington also submitted a PM_{10} Attainment Plan to USEPA in December 1994. USEPA approved the plan in January 1997. The plan relies on control strategies for windblown dust from unpaved and paved roads and residential wood combustion (USEPA 2004d).

The Spokane area enjoys a moderate four season climate. The Cascade Mountain Range protects the area from the damp coastal weather that is often associated with the Northwest, particularly the Puget Sound area. The Rocky Mountains to the east of Spokane perform the same function to keep the region's winters relatively mild. Yearly precipitation averages only 16.71 inches. Maximum and minimum normal monthly temperatures range from 33.9 degrees Fahrenheit (°F) to 23.5 °F in January to 82.8 °F to 55.2 °F in July. Precipitation occurs on average 90 days per year (WRCC 2004).

The Spokane County Air Pollution Control Authority (SCAPCA) works with Fairchild AFB in monitoring and implementing the installation's stationary source permits and emissions inventory. As required by SCAPCA permitting requirements, Fairchild AFB routinely calculates annual criteria pollutant emissions from stationary emissions sources and provides this information to the state. However, there is no routine requirement to calculate pollutant emissions calculations for aircraft operations, government-owned and privately owned vehicles (GOVs and POVs), aircraft engine testing, aerospace ground equipment (AGE), and other sources not included in the state's stationary source permitting program.

Fairchild AFB is classified as a synthetic minor source and has voluntary limits on air emissions (see Chapter 173-401-300 Washington Administrative Code [WAC]). There are various stationary combustion sources on installation that have the potential to emit, including the installation's hospital boilers, other boilers, and generators. VOCs are emitted primarily from handling of organic liquids (i.e., refueling activities). Miscellaneous particulate matter sources at Fairchild AFB include abrasive blasting units, woodworking equipment, and a dust collection system designed to capture emissions from a firing range (at the target end of the range) (SCAPCA 2000).

Each calendar year, Fairchild AFB is required to prepare and submit an annual emissions inventory to Headquarters AMC. The purpose of this annual emissions inventory is to estimate and document air pollutant emissions from stationary sources. Stationary source categories include external combustion sources, internal combustion sources, fuel transfer/dispensing, storage tanks, surface coating operations, degreasers/solvent cleaners, aircraft fuel cell maintenance, off-aircraft engine testing, miscellaneous chemical usage, and dust collectors.

The Fairchild AFB annual emissions for Calendar Year (CY) 2005 from stationary and area sources are shown in **Table 3-3**. Emissions from mobile sources are not tracked on Fairchild AFB.

Table 3-3. Annual Stationary and Area Source Emissions for Fairchild AFB (2004)

Year	NO_x	VOC	SO_x	CO	PM
2005	11.9	4.0	0.2	3.2	1.2

Source: FAFB 2005a

3.4 Safety

3.4.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses (1) workers' health and safety during demolition activities and facilities construction, and (2) public safety during demolition and construction activities and during subsequent operations of those facilities.

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DOD and USAF regulations designed to comply with standards issued by the Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

3.4.2 Existing Conditions

All contractors performing construction activities are responsible for following ground safety and OSHA regulations and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and use and availability of Material Safety Data Sheets. Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplaces; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous material), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures or engaged in hazardous waste work.

There are several areas that are constrained by ESQD clear zones at Fairchild AFB. These zones are associated with the alert area, Explosive Combat Aircraft parking, and the Munitions Storage Area. Fairchild AFB is aggressively managing its development program to ensure that it meets explosive safety requirements. There are currently no electromagnetic radiation safety zones, antenna look-angles, or security clear zones that affect development on Fairchild AFB.

Range sites on Fairchild AFB contain various munitions, unexploded ordnance (UXO), and Chemical Agent Identification Sets (CAIS). Most of the munitions, UXO, and CAIS on the surface have been removed. However, munitions, UXO, and CAIS still can be found below the ground surface. Although

most of the projects are not within range sites, munitions, UXO, and CAIS can still be encountered within these project areas.

The need for munitions, UXO, and CAIS screening at potential UXO sites will be determined on a case-by-case basis. Any projects within potential UXO sites would obtain an environmental restoration waiver from HQ AMC prior to commencement of construction activities. 92 CES/CEV staff would be coordinated with prior to commencement of construction activities to determine if an ERP waiver is required for the Proposed Action for all proposed work on or near range sites and for safety requirements that would need to be followed during construction.

3.5 Geological Resources

3.5.1 Definition of the Resource

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography, soils, geology, minerals, and, where applicable, paleontology.

Topography. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Soils. Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use.

Geology. Geology, which concerns itself with the study of the earth's composition, provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality, quantity, and its movement.

3.5.2 Existing Conditions

The geological resources information provided in this EA was obtained from the *Fairchild Air Force Base General Plan* (92 ARW 2005) and the Integrated Natural Resources Management Plan (INRMP) (FAFB 2005b). The general topography of Fairchild AFB is flat with an average elevation of 2,340 feet above mean sea level (msl). Fairchild AFB is near the eastern edge of the Columbia Basin physiographic province. The Columbia Basin province is primarily characterized by incised rivers, extensive plateaus, and anticlinal ridges (WDNR 2001). The Cascade mountain range is 180 miles west of the installation. The Selkirk Mountains and Okanogan and Kettle River Ranges are north of the installation and are oriented north to south. They connect to the Cascades to the west and to the Rocky Mountains to the east. The Bitterroot Range of the Rocky Mountains is 90 miles east of Fairchild AFB and the Blue Mountains are 100 miles south of the installation.

The Spokane region is within the northernmost extent of the Miocene-aged Columbia Plateau lava flows. Layers of basalt might be as much as 500 feet thick with interbeds between layers of gravels, silts, or pyroclastic materials. During the Pleistocene (10,000–15,000), a series of cataclysmic floods from glacial ice dam failures on the Clark Fork River in Montana flooded much of the Spokane area. The Spokane

River valley was widened and up to 500 feet of flood alluvium was deposited. Floodwaters dispersed across the Columbia Plateau intermittently scouring the landscape and depositing flood alluvium.

Natural Hazards. The state of Washington has an average of 1,000 earthquakes per year (WDNR 2001). It is characterized by a moderate to high level of seismic activity, and Spokane has a moderate level of seismic activity (WSU 2001). The Spokane area does not typically experience a large quantity of earthquakes because of its location in relation to fault zones. The most recent seismic activity felt in Spokane was in 2001, when there was a series of unusual earthquakes. The strongest earthquakes occurred on November 11, 2001, with a magnitude of 4.0 on the Richter scale (WSU 2001).

Soils. The following soils information is taken from the Spokane County Soil Survey dated 1968; an update is currently underway that will further define soils of lesser extent. Soil series occurring on Fairchild AFB are Cheney, Uhlig, Bong, Phoebe, Cocolalla, and unnamed shallow and very shallow soils. Bong and Phoebe series are in the northern portion of the installation. They are derived from glaciofluvial materials, range from 30 to more than 60 inches deep, have moderately coarse to coarse textures, and are somewhat excessively drained. A complex of Cheney, Uhlig, Cocolalla, and unnamed soils, shallow and very shallow, occur south of the airfield and JPRA. The dominant soils are Cheney and Uhlig soils. They are derived from glaciofluvial materials over basalt bedrock with mixed loess/volcanic ash surface layers. Cheney occupies the most area and is 20 to 40 feet deep, has moderately coarse to medium textures, and is well-drained. Associated with Cheney are basalt bedrock outcrops and the unnamed shallow and very shallow soils. Uhlig soils are 40 to 60 feet deep, have medium textures, and are well-drained. Cocolalla soils occupy about 500 acres of the installation with the majority of these acres south of the airfield. Cocolalla soils are very deep, have moderately fine to fine textures, and are somewhat poorly to poorly drained. The general topography is nearly level to undulating throughout the installation. Major constraints for these soils are drainage class and soil depth.

3.6 Water Resources

3.6.1 Definition of the Resource

Water resources include groundwater, surface water, and floodplains. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

Groundwater. Groundwater consists of the subsurface hydrologic resources. It is an essential resource that functions to recharge surface water and is used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate. Groundwater occurs at several depths at the interface of Basalt A and Basalt B and within Basalt B. Groundwater has been found in an aquifer at 100 to 200 feet and another at 400 to 500 feet. Spokane County maintains authority to regulate activities in groundwater recharge areas in the county (Chapter 11.20, *Critical Area Ordinance*).

Surface Water. Surface water resources consist of lakes, ponds, rivers, and streams and function as an ecological resource that provides both habitat and transportation. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale.

Storm water is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Storm water flows are exacerbated by high proportions of impervious surfaces (e.g., rooftops, parking lots, sidewalks) and are important to the management of surface water. For instance, a large, sudden flow from a heavy rain event could scour a streambed and harm biological resources within that ecosystem. Storm water systems convey precipitation away from developed sites to receiving surface waters. Various systems and devices

might be used to slow the movement of water. Storm water systems provide the benefit of reducing sediments and other contaminants that would otherwise flow directly into surface waters. Failure to size storm water systems appropriately to hold or delay conveyance of the largest predicted precipitation event often leads to downstream flooding and the environmental and economic damages associated with flooding. Higher densities of development, such as those found in urban areas, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

The Clean Water Act (CWA) (33 U.S.C. 1251 et seq.) sets the basic structure for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA (33 U.S.C. 1344) establishes a Federal program to regulate the discharge of dredged and fill material into waters of the United States. The U.S. Army Corps of Engineers (USACE) administers the permitting program for this law. Section 401 of the CWA (33 U.S.C. 1341) requires that proposed dredge and fill activities permitted under Section 404 be reviewed and certified by the designated state agency so the proposed project will meet state water quality standards. The Federal permit is deemed to be invalid unless it has been certified by the state. The WDOE is designated by statute as the state agency responsible for issuing Section 401 water quality certification.

The Washington Department of Fish and Wildlife (WDFW) has the authority to regulate any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water through the Hydraulic Project Approval (HPA) process (Chapter 77.55 *Revised Code of Washington* [RCW]).

Floodplains. Floodplains are areas of low-level ground present along rivers, stream channels, or coastal waters. Such lands might be subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Certain facilities inherently pose too great a risk to be located in either the 100- or 500-year floodplain, such as hospitals, schools, or storage buildings for irreplaceable records. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative. Where the only practicable alternative is to site in a floodplain, a specific step-by-step process must be followed to comply with EO 11988 outlined in the FEMA document *Further Advice on EO 11988 Floodplain Management*. As a planning tool, the NEPA process incorporates floodplain management through analysis and public coordination of the EA.

Spokane County Ordinance 88-0521 regarding flood protection states that no development, structure, manufactured home, works, or fill shall be undertaken, constructed, located, extended, connected, or altered on any property or any portion which is in any area of special flood hazard.

3.6.2 Existing Conditions

Groundwater. Fairchild AFB is underlain by alluvial sediments and two layers of basalt associated with the regional Columbia River Basalt Group (AFCEE 2000). The uppermost basalt is referred to as

Basalt A, and the deeper basalt sequence is referred to as Basalt B. The top of Basalt A is fractured and highly weathered in places, while the center is more massive and fine-grained with infrequent fractures and low permeability. Basalt B is porous and vesicular at the top and progressively denser with depth (AFCEE 2000).

The uppermost groundwater in the area is typically encountered from 3 to 12 feet below ground surface in alluvium or in the fractured and weathered uppermost portion of Basalt A. Groundwater flows generally from west to east across the installation. In some locations, a high degree of hydraulic conductivity exists between the alluvium and shallow basalt water-bearing zones. In other areas, the shallow alluvium and basalt bedrock water-bearing zones are separated by a low-permeability clay layer. Groundwater flow within Basalt A occurs predominantly where the number of interconnected fractures is highest in the upper and lower portions of the formation. Vertical groundwater movement through Basalt A is typically slow because of the tightness of fractures within the center of the basalt formation (AFCEE 2000).

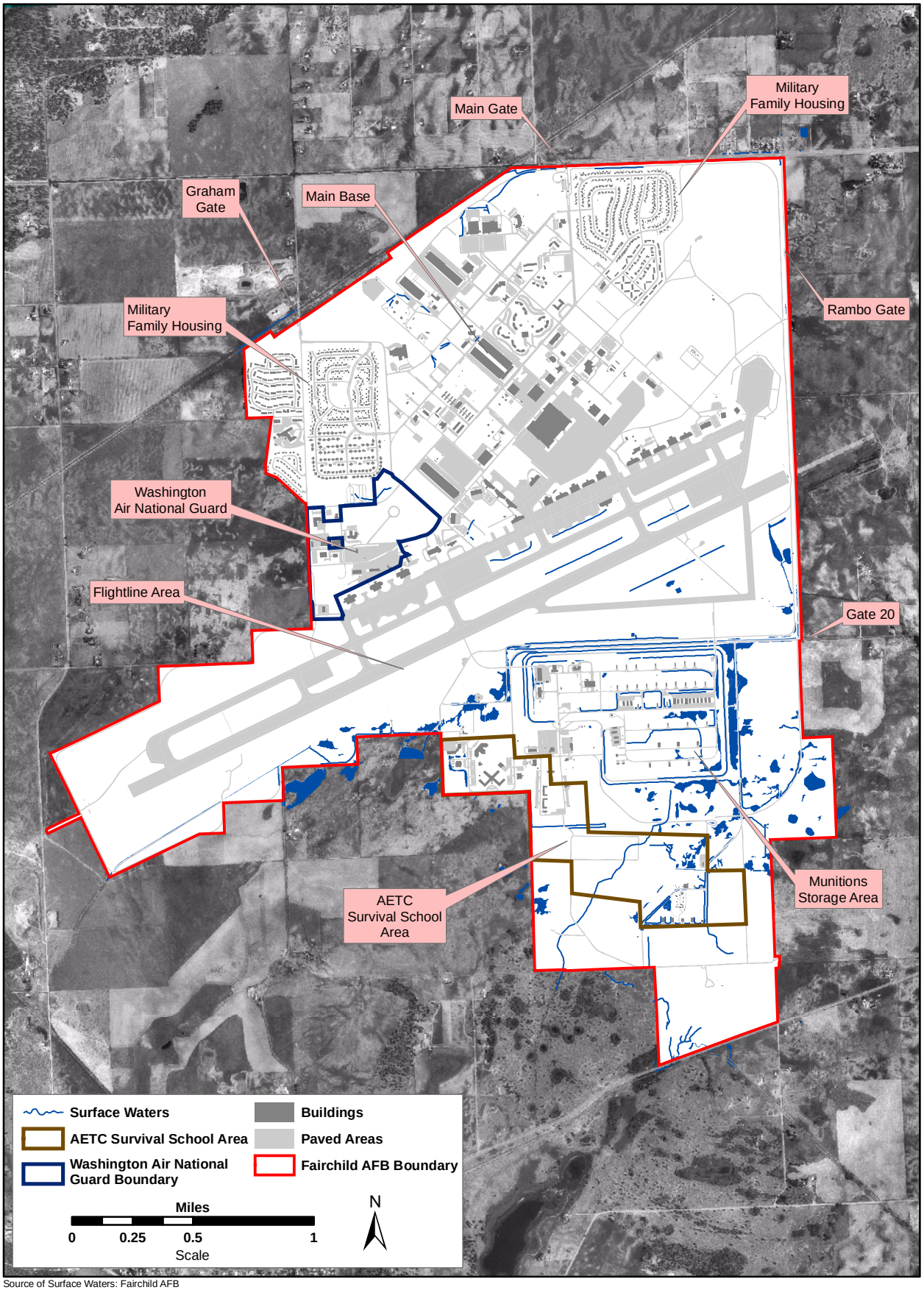
Fairchild AFB receives almost all of its water from wells at the Fort George Wright Annex. However, a seasonal well at the extreme southeastern corner of the installation pumps water to the water distribution grid. This well is used only when water demands cannot be met from the Fort George Wright Annex wells (92 ARW 2005). All wells are monitored closely for possible contamination. According to the Spokane County Department of Building and Planning (SCDBP), Fairchild AFB is in an area of moderate to high susceptibility for aquifer contamination (SCDBP 2005).

Like Fairchild AFB, the JPRA is also underlain by the Columbia River Basalt Group. A well located in what is currently WDNR property provides water to the JPRA (FAFB 2005b). According to the SCDBP, the JPRA is in an area of low to moderate susceptibility for aquifer contamination (SCDBP 2005).

Surface Water. The topography of the main installation of Fairchild AFB is nearly flat and positioned on a subtle topographic divide that defines the boundary of three watersheds. These watersheds are Lower Spokane, Hangman, and Palouse watersheds (WDOE 2004). Surface hydrology on Fairchild AFB can generally be described as isolated from free-flowing surface waters within these watersheds. **Figure 3-2** shows the surface water features on the installation. Surface water features are either storm water catchments or conveyances or wetlands with seasonal or persistent ponding. There are no natural free-flowing streams or natural fluvial topography on the main installation.

Fairchild AFB is divided into eight drainage basins correlating to the National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit (No. WAR05A025) (92 ARW 2005). Existing permits apply to six of the eight basins (Basins 2 and 8 are omitted from the Storm Water Pollution Prevention Plan (SWPPP) because no industrial activities occur there). Basin 1 is the largest basin, draining about one-third of Fairchild AFB, and contains the most industrial activities. Basins 5 and 7 drain the WANG facilities and AETC Survival School, respectively. **Table 3-4** provides descriptions of the eight drainage basins on the installation.

The storm drainage system is composed of storm water collection catch basins, drywells, collection piping, lagoons, ditches, and other above- and below-grade storm water conveyances. The majority of runoff at Fairchild AFB infiltrates the ground or drains to a drainage pond. Since the majority of precipitation infiltrates or evaporates in localized topographic depressions, a significant portion of Fairchild AFB generates little storm runoff. Shallow soils, perched water tables, and nearly flat topography create a challenge for surface storm water management during high precipitation months (92 ARW 2005). Storm water is managed both by surface and belowground conveyances. Belowground conveyances discharge to a containment/settling pond where suspended sediments settle out and waters are discharged into a ditch that runs off the installation to an agricultural field that is managed for alfalfa production.



Source of Surface Waters: Fairchild AFB

Figure 3-2. Location of Surface Waters on Fairchild AFB

Table 3-4. Fairchild AFB Drainage Areas

Basin ID	Area of Impervious Surface (acres)	Description of Basin
1	700	Hospital, residential areas, majority of flightline and airport industrial area, hangars for aircraft maintenance and repair, building maintenance and repair shops, fuel storage and handling facilities, heat generating facilities, aircraft parking/fueling stubs, runway and taxi area, and Military Family Housing
2	not listed	Military Family Housing
3	100	Civil Engineering building and maintenance shops, Bulk Fuel Storage, gas station, Defense Reutilization and Marketing Office storage yard, Hazardous Materials Pharmacy facility
4	60	Portion of flightline and inactive installation landfill
5	170	WANG hangars, aircraft support facilities, and portions of the flightline
6	30	Two weapons storage areas; also contains undisturbed native growth areas with wetlands, dry-land grasses, and natural drainage channels
7	50	Facility maintenance shops, motor pool, AETC Survival School, and large acreage of undeveloped land
8	5	Mainly undeveloped land with dry-land grasses and wetlands

Source: 92 ARW 2005

Wetlands occur in the southern portion of Fairchild AFB as a result of the shallow, perched water table. These wetlands are not hydrologically connected to free-flowing waters. Some wetlands have resulted from storm water runoff and catchment by roads, while other wetlands are natural and in varying ecological condition. **Section 3.7.2** contains more detailed information about the wetlands on Fairchild AFB.

At the JPRA, there are no surface water bodies. Storm water drains via a drainage ditch in the center of the property, which exits the JPRA on the western border. Storm water management is adequate for the property (FAFB 2005b). Surface waters at the JPRA are isolated waters with no connection to other watercourses within the Lower Spokane River Watershed. Water System Annex 1 is on a stream terrace of the Spokane River. Clear Lake Recreational Area is along the shoreline of Clear Lake. Clear Lake is in the Crab Creek watershed which is a tributary of the Columbia River. Major constraints associated with these water resources are wetlands protection; water quality/quantity at Water Annex No. 1; and 200-foot shoreline protection, one at Clear Lake and one at Water Annex No. 1.

Floodplains. Fairchild AFB has two land holdings in the 100-year floodplain: Water System Annex 1 and Clear Lake Recreation facility, both of which are auxiliary sites (92 ARW 2005). No portions of the 100-year floodplain are on Fairchild AFB or the JPRA.

The Water System Annex 1 is on the Spokane River. In complying with Spokane County Ordinance 88-0521 and EO 11988, no further development of the Water System Annex 1 is planned. The 100-year floodplain elevation at Clear Lake Recreation Facility is considered to be 2,350 feet. One facility, a snack bar, is within the 100-year floodplain.

3.7 Biological Resources

3.7.1 Definition of the Resource

Biological resources include wildlife (fauna), vegetation (flora), and the ecosystems in which these resources occur. Specific concerns relating to biological resources consist of declines in species diversity, impacts on threatened and endangered species, and degradation of wetlands and riparian zones.

Vegetation and Wildlife. Sensitive and protected biological resources include federally listed (endangered or threatened), proposed, and candidate species, and designated or proposed critical habitat; species of concern managed under Conservation Agreements or Management Plans; and state-listed species.

Threatened and Endangered Species. The ESA (16 U.S.C. 1531 et seq.) specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure an action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction of critical habitat for these species, unless the agency has been granted an exception. The Secretary of the Interior, using the best available scientific data, determines which species are officially threatened or endangered. Washington maintains a list of Species of Concern pursuant to WAC 232-12-297. Species of Concern in Washington include all state endangered, threatened, sensitive, and candidate species. Species of Concern also include Federal endangered, threatened, and candidate fish stocks.

Wetlands. Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat, and erosion protection. Wetlands are protected as a subset of the "the waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR Part 328).

The USACE is responsible for making jurisdictional determinations and regulating wetlands under Section 404 of the CWA. The USACE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899. The Natural Resources Conservation Service (NRCS) has developed procedures for identifying wetlands for compliance with the Food Security Act of 1985, and the National Wetlands Inventory (NWI) has developed a classification system for identifying wetlands. Through the NWI, the USFWS is the principal Federal agency that provides information to the public on the extent and status of wetlands.

EO 11990, *Protection of Wetlands*, requires that Federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

Two state laws, the State Water Pollution Control Act (Chapter 90.48 RCW), and the Shoreline Management Act (SMA) (Chapter 90.58 RCW), give WDOE authority to regulate wetlands. The State Water Pollution Control Act designates WDOE as the lead state agency for implementing provisions of

the Federal CWA. The SMA regulates only wetlands within 200 feet of shoreline water bodies and wetlands "associated" with these water bodies. WDOE encourages the use of the Washington State Wetland Rating System (either Eastern or Western Washington version) to assist with decisionmaking about the management of a particular site. The four basic criteria that determine a wetland's placement in a category are rarity, irreplaceability, sensitivity to disturbance, and habitat functions. Spokane County maintains authority to regulate activities in wetlands in the county (Chapter 11.20, *Critical Area Ordinance*).

Riparian Areas. The WDOE has proposed riparian buffer ranges to be used in conjunction with different category wetlands. Spokane County maintains authority to regulate activities in wetland riparian buffers in the county (Chapter 11.20, *Critical Area Ordinance*). Riparian areas are transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems. Specifically, they include portions of the channel system and associated features (e.g., gravel bars, islands, and wood debris); a vegetated zone of various successional states influenced by floods, sediment deposition, soil-formation processes, and water availability; and a transitional zone to the adjacent uplands, all underlain by an alluvial aquifer (NRC 2002).

Riparian areas provide stream microclimate modification and shade, bank stabilization and modification of sediment processes, organic litter and wood to aquatic systems, nutrient retention and cycling, wildlife habitat, and food-web support for a wide range of aquatic and terrestrial organisms (NRC 2002). There is no Federal regulatory program that attempts to manage ecologically harmful activities within riparian areas (e.g., livestock grazing, clear-cutting). However, there are Federal programs that apply to certain activities in riparian areas. Section 404 of the CWA applies only to those riparian areas that are included in the jurisdictional definition of wetlands. The ESA has served as authority to regulate the development and use of land in riparian areas that provide essential habitat for a listed threatened or endangered plant or animal species. Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water-quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a water body can receive and still be in compliance with state water quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment, and to develop an implementation plan that will allocate reductions to each source to meet the state standards. The TMDL program is currently the nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL plans typically call for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

Protection of Valuable Natural Resources. Washington counties are required to protect critical areas through the adoption of policies and regulations. Critical areas include (a) wetlands, (b) areas with a critical recharging effect on aquifers used for domestic purposes, (c) fish and wildlife habitat conservation areas, (d) frequently flooded areas, and (e) geologically hazardous areas. Details of Spokane County's critical areas are outlined in the County's Comprehensive Plan. Spokane County's Critical Areas Ordinance (Chapter 11.20) is intended to help protect and preserve these limited natural resources.

The goal of designating critical areas is that they will be preserved, protected, managed, and restored so that the functions and values of these areas are maintained. The Critical Areas Ordinance contains numerous requirements to help protect designated critical areas. The most prevalent include setback and use restrictions. Briefly, for wetlands, "buffer" setbacks can range from 25 to 200 feet, depending on the

classification of the wetland; fish and wildlife habitat requirements regulate uses within a quarter-mile of "point" locations (dens and nests) of priority species and require "buffers" ranging from 25 to 250 feet of riparian areas adjacent to flowing rivers and some creeks; geohazard area requirements regulate development on slopes of 30 percent or greater; and Critical Aquifer Recharge Areas limit allowable uses within designated areas to help protect groundwater quality.

3.7.2 Existing Conditions

Fairchild AFB is a Category I installation, as defined in AFI 32-7064. Category I installations contain suitable habitat for conserving and managing fish and wildlife, while Category II installations do not. However, nearly three-fourths of the installation is developed land (e.g., buildings, runways, and landscaped fields). The majority of undeveloped land and valuable habitat in terms of size, species abundance, and management potential, occurs in the southern portion of the main installation, JRPA, Clear Lake, and Water System Annex 1.

Vegetation. Fairchild AFB is in the Columbia Basin Province where grassland or shrub-steppe vegetation grades into ponderosa pine forest. Vegetation plant communities in this region show a wide range of diversity depending on soil conditions, hydrology, topographic aspect, and microclimate. Plant communities consist of Idaho fescue/bluebunch wheatgrass on Cheney soils in upland positions, oatgrass/Sandberg bluegrass on unnamed shallow soils, ponderosa pine/snowberry on upland positions near rock outcrops and wetlands, and wetland plant communities (FAFB 2005b).

Improved and semi-improved areas on Fairchild AFB make up approximately 3,500 acres and are mostly found in the northern portion of the installation. Approximately 700 acres in the northeastern corner and southern portion of the installation are primarily unimproved areas, open grass fields, wetlands, and stands of ponderosa pine, along with areas of mixed native and nonnative grasses, weeds, and shrubs.

The JPRA consists of a fenced area containing several offices and satellite tracking facilities. The fenced area contains a clear zone supporting open, mowed grass areas and an open grass field immediately southwest of the main facility.

Wildlife. Wildlife abundance and species diversity are relatively low within developed portions of the installation, primarily due to degraded natural habitats. Wildlife present in developed portions of the installation are typical of urban areas and usually include no large mammals, few small mammals (mostly deer mice, voles, and moles), and bird communities dominated by fruit-eating or omnivorous species, such as American robin, European starling, cedar waxwing, and purple finch. There is a higher diversity of wildlife including deer, pheasant, abundant neotropical birds, and raptors that use the diverse habitats on the southern portion of the main installation, Clear Lake, and Water Well Annex 1 (FAFB 2005b).

The JPRA does not support a diversity of wildlife, and it is most likely used by bird species associated with open ponderosa pine forest such as European starling, western meadowlark, and Brewer's blackbird. The JPRA includes an open grass field immediately southwest of the main facility. This area is unfenced and provides open space for hawks, upland gamebirds, and other types of wildlife present in the area.

Threatened and Endangered Species and Species of Special Concern. Developed portions of the installation are not expected to provide suitable habitat for Federal- or state-listed threatened or endangered species. The Nature Conservancy conducted a survey for threatened and endangered species at Fairchild AFB in 1993 and 1994. The Washington Natural Heritage Program (WNHP) reconfirmed the survey in 1999. Spalding's catchfly and water howellia are federally listed species known to occur or have the potential to occur within the vicinity of Fairchild AFB, satellite installations, and the JPRA. In

addition, *Juncus uncialis*, *Pilularia americana*, and *Sclerolinon digynum* are listed as sensitive or threatened by Washington state and are associated with vernal pools on Fairchild AFB.

Bald eagles (*Haliaeetus leucocephalus*), a Federal- and state-listed as threatened species, are known to nest throughout Washington, and migrate through the area encompassing and adjacent to the installation. Bald eagles nest along some of the coastal areas, major rivers, and larger reservoirs within Washington.

Golden eagle (*Aquila chrysaetos*), a state candidate species, has been documented on Fairchild AFB. Habitat generally consists of open country, open wooded country, and barren areas, especially in hilly or mountainous regions. Nests are found on the rock ledge of cliffs or in large trees.

Burrowing owl (*Athene cunicularia*), a Federal species of concern and state candidate species, has been observed foraging and nesting on the Fairchild AFB airfield in the past. Habitat of the burrowing owl usually consists of open grassland, prairies, farmland, and airfields.

Western bluebird (*Sialia mexicana*), a state sensitive species, has been observed exhibiting breeding behavior on Fairchild AFB and likely nests on installation. Habitat consists of open woodlands, farmlands, orchards, savanna, riparian woodlands, and burned woodlands. It also inhabits desert areas during the winter in mesquite-mistletoe groves.

Washington ground squirrel (*Spermophilus washingtoni*), a state and Federal candidate species, has not been observed on Fairchild AFB. However, preliminary surveys conducted by the Nature Conservancy in 1993 and 1994 determined that suitable habitat on installation exists for the Washington ground squirrel. Columbian ground squirrels (*Spermophilus columbianus*), a species being carefully monitored by the WDFW Wildlife Program, were identified in several locations on the installation during these inventories.

American badger (*Taxidea taxus*), a species also being carefully monitored by the WDFW Wildlife Program, has been documented as occurring on installation. WDFW also indicated that white-tailed jackrabbits (*Lepus townsendii*), a state candidate species, occur on installation. White-tailed jackrabbits warrant special consideration under the WDFW Priority Habitat and Species Program.

No threatened or endangered reptile or amphibian species were indicated as potentially occurring on or in the vicinity of Fairchild AFB.

The USFWS reported that the following federally threatened vegetation species have the potential to occur in the vicinity of Fairchild AFB (FAFB 2005b): Ute ladies' tresses (*Spiranthes diluvialis*), water howellia (*Howellia aquatilis*), and Spalding's catchfly (*Silene spaldingii*). Ute ladies' tresses are also state-listed as endangered and water howellia and Spalding's catchfly are each state-listed as threatened. Of these species, only Spalding's catchfly and water howellia are known to occur on the southern portion of the installation. Spalding's catchfly and its associated habitat are protected on Fairchild AFB (see **Figure 3-2**).

Wetlands. The NRCS conducted a wetland inventory on Fairchild AFB and associated installations in 1991. Wetlands were identified and delineated using the methodology contained in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetland*s (FAFB 2005b). This inventory delineated approximately 215 acres of wetlands on Fairchild AFB and associated installations. Dominant vegetation in most wetlands consisted of reed canary grass (*Phalaris arundinacea*) and other nonnative weed species. About 60 percent of the wetlands are in fair to poor condition, and are emergent wetlands dominated by reed canary grass. Other better condition wetlands support bulrush and rush spp., some cattail, open water, and wetland shrubs. The highest-valued wetlands are the forested wetlands at Clear

Lake, the riparian zone at Water Well Annex 1, and the large palustrine scrub-shrub wetland along the southern boundary of the installation that has been designated as the Wetland Management Zone.

Fourteen areas in the southern portion of Fairchild AFB have been identified as vernal pools by the Natural Heritage Program (WDNR 2003). Vernal pools are small relatively shallow water areas which remain wet during the cool season but become completely dry during most of the warm season. The location and extent of vernal pools on the installation were determined during a vernal pool survey conducted by the WNHP in 2003. **Figure 3-3** shows the locations of wetlands and vernal pools on Fairchild AFB. There are no wetlands or vernal pools within the JPRA.

Riparian Areas. Riparian areas are located along the shoreline of Clear Lake in the Recreational Area and along the Spokane River at the Water Well Annex 1. Riparian vegetation exists along the transition zone of many of the wetlands at the main installation. No riparian areas exist at JPRA.

3.8 Cultural Resources

3.8.1 Definition of the Resource

"Cultural resources" is an umbrella term for many heritage-related resources. Cultural resources can include archeological sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on their condition and historic use, such resources can provide insight into living conditions of previous existing civilizations, or might retain cultural and religious significance to modern groups.

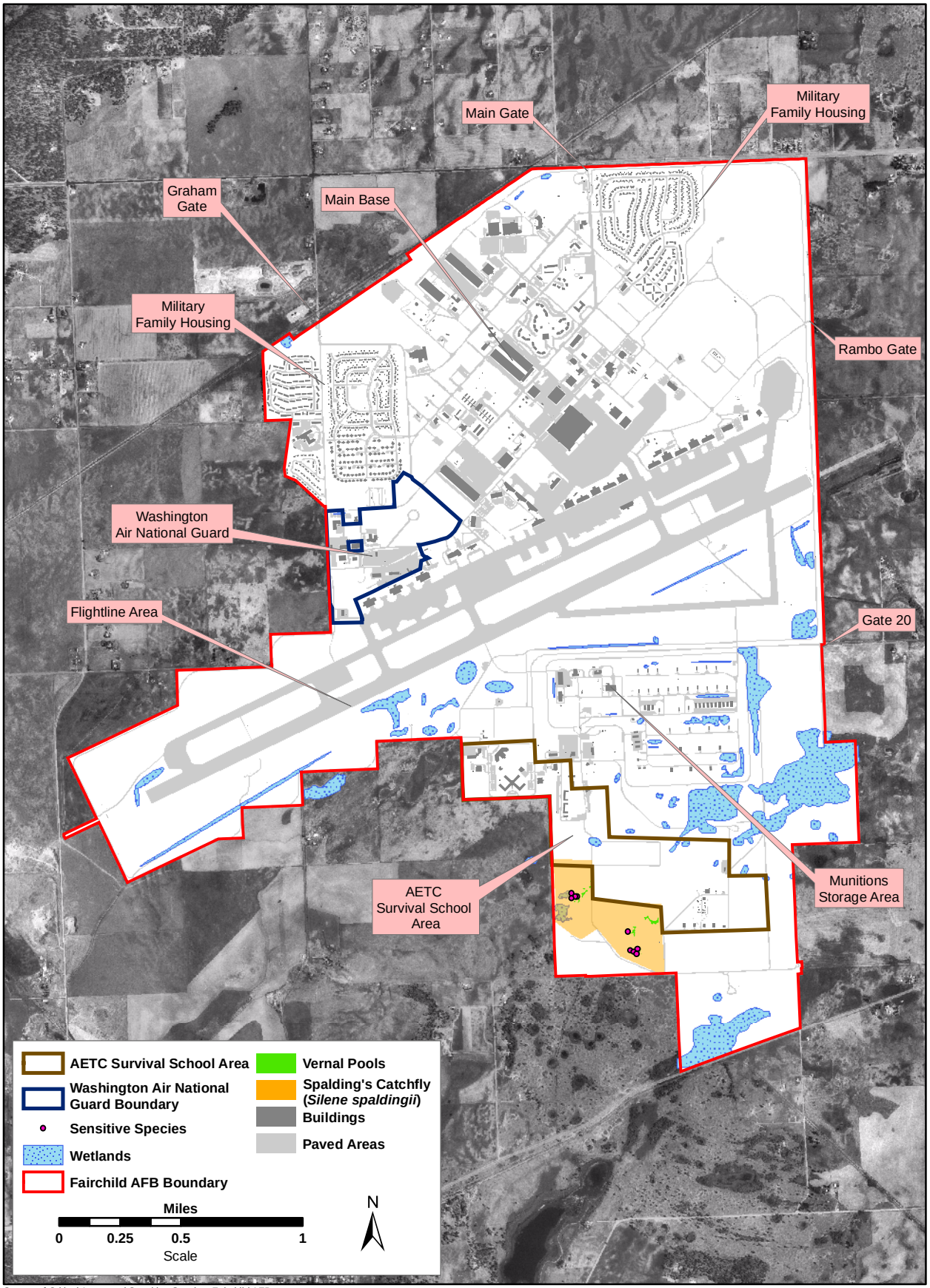
Several Federal laws and regulations govern protection of cultural resources, including the National Historic Preservation Act (1966), as amended; the Archeological and Historic Preservation Act (1974); the American Indian Religious Freedom Act (1978); the Archeological Resources Protection Act (1979); and the Native American Graves Protection and Repatriation Act (1990) (NAGPRA), as amended.

Typically, cultural resources are subdivided into archeological resources (prehistoric or historic sites where human activity has left physical evidence of that activity but no structures remain standing), or architectural resources (buildings or other structures or groups of structures, or designed landscapes that are of historic or aesthetic significance).

Archeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points and bottles).

Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered for nomination to the National Register of Historic Places (NRHP). More recent structures, such as those associated with significant Cold War-era events or individuals, can also be considered eligible for nomination but must meet National Register Criterion Consideration G for exceptional significance.

Traditional cultural properties or *sacred sites* can include archeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that American Indians, Native Hawaiian, Native Alaskan, or other ethnic or social groups consider essential for the preservation of traditional culture.



Source of Critical Areas and Sensitive Species: Fairchild AFB

Figure 3-3. Map of Critical Areas and Protected Species Locations on Fairchild AFB

The EA process and the consultation process prescribed in Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR 800) require an assessment of the potential impact of an undertaking on historic properties that are within the proposed project's Area of Potential Effect (APE). The APE is defined as the geographic area(s) "within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Under Section 110 of the NHPA, Federal agencies are required to locate and inventory all resources under their purview that are listed or eligible for listing in the NRHP on owned, leased, or managed property. In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, determinations regarding the potential effects of an undertaking on historic properties are presented to the SHPO. The APE of the Proposed Action encompasses the entire area of Fairchild AFB and the JPRA complex.

3.8.2 Existing Conditions

Archeological Resources. The main portion of Fairchild AFB was constructed on high, relatively rocky land that was nearly devoid of water. Previous investigations within Fairchild AFB have recorded six prehistoric archeological sites, five of which have been deemed not eligible for nomination in the NRHP. The remaining site, 45 SP 255, is a prehistoric deposit identified at the Water System Annex 1 (92 CES/CEV 2002a). This site requires further evaluation to determine its NRHP eligibility.

Similarly, although evidence of historic American Indian and Euroamerican settlement has been noted both to the north and south of Fairchild AFB, no such evidence has been recorded within Fairchild proper. Construction of extensive irrigation systems to facilitate farming of this area resulted in late historic disturbance of the installation; construction of the installation in the 1940s caused further, more extensive disturbance. Based on the degree of disturbance and the poor environmental conditions (lack of water) within this land area prior to the late historic period, the potential for encountering intact archeological resources within Fairchild AFB is considered to be low.

The JPRA (titled the Communication Facility Annex Site 07 in the ICRMP for Fairchild AFB) was completely inventoried for archeological resources in 1985. No archeological deposits were recorded; however, rock alignments on a low hilltop were identified as a possible archeological feature. Consultation with the SHPO subsequently resulted in a recommendation that this feature was not eligible for nomination in the NRHP. Based on the results of this survey, the potential for encountering further archeological resources within the JPRA is considered to be low.

Architectural Resources. Evaluation of buildings and structures completed for Fairchild AFB prior to 2006 (Lowe et al. 1994, Emmerson 1999, 92 CES/CEV 2002a, e²M 2004) identified three buildings as eligible for the NRHP: Building 2050 (Maintenance Hangar), Building 2080 (Bomber Alert Facility), and Building 2150 (Engine Test Cell). Historic American Building Survey/Historic Archeological Engineering Record documentation was completed on Buildings 2080 (Emmerson 1999) and 2150 (AHSEWU 1996), and the latter has been demolished. Buildings or structures noted as having potential Cold War-era significance include Building 1467 (the Segregated Storage Igloo) and the AETC Survival School buildings (92 CES/CEV 2002a). Most of the MFH units within the installation were constructed in the late 1950s or early 1960s as part of the Capehart Wherry housing programs. However, Commander's Circle was built in 1996, and 14 new units were built in Fort Wright Village in 2000. All units in Galena Station underwent extensive remodeling beginning in the early 1990s.

An architectural survey of 189 buildings and structures within Fairchild AFB conducted in summer 2006 resulted in the identification of three potential historic districts (e²M 2007), one at the former Deep Creek Air Force Station site south of the runway (includes both the weapons and conventional storage areas, as well as the AETC Survival School buildings), one comprising the hangars and support structures on the

flightline, and one comprising the Fairchild Satellite Operations Center buildings and dome foundation at the JPRA. Buildings that were identified as individually eligible for listing on the NRHP include Building 1467 in the munitions area, Building 2080 along the flightline, and Building 15 at the JPRA.

Building 1306 (C23) and Buildings 1324, 1334, 1342, and 1350 (D7), all of which are considered contributing elements to the proposed Deep Creek historic district, are proposed for demolition or renovation (additions or alterations) under the IDEA. The USAF will coordinate with the Washington SHPO regarding ways to avoid, minimize, or mitigate the effects of these actions on the historic district.

Traditional Cultural Properties and Resources of Interest to American Indian Tribes. No traditional cultural properties or resources of significance have been identified within Fairchild AFB or the JPRA by the federally recognized Spokane or Coeur d'Alene Tribes. As noted in the discussion of archeological resources, pre-Contact and Contact period land use within this region appears to have been minimal due to the lack of water and rocky soils. The potential for encountering either traditional cultural properties or resources of interest to American Indian tribes is considered to be low.

3.9 Socioeconomics

3.9.1 Definition of the Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these three fundamental socioeconomic indicators might be accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment might identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" effects of any jobs created or lost as a result of a proposed action. Data on industrial or commercial growth or growth in other sectors provides baseline and trend line information about the economic health of a region.

In appropriate cases, data on an installation's expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base. Demographics identify the population levels and changes to population levels of a region. Demographics data might also be obtained to identify, as appropriate to evaluation of a proposed action, a region's characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

On February 11, 1994, the President issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The essential purpose of the EO is to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies. Consideration of environmental

justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of where a proposed action would occur. Such information aids in evaluating whether a proposed action would render vulnerable any of the groups targeted for protection in the EO.

Socioeconomic data shown in this section are presented at the U.S. Census Bureau Tract, Metropolitan Statistical Area (MSA), and state levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. An MSA is a geographic entity defined for use by Federal statistical agencies based on the concept of a core urban area with a high degree of economic and social integration with surrounding communities. Data have been collected from previously published documents issued by Federal, state, and local agencies and from state and national databases (e.g., U.S. Bureau of Economic Analysis' Regional Economic Information System).

On April 21, 1997, the President issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. The EO further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. The order defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or are exposed to)." Such information aids in evaluating whether a proposed action would adversely impact children afforded protection by the EO.

3.9.2 Existing Conditions

For this Proposed Action, the socioeconomic baseline is presented using three levels of comparison: the Region of Influence (ROI); the Spokane, Washington MSA; and the state of Washington. The ROI was defined by identifying census tracts surrounding Fairchild AFB. Census tracts 138, 139, 140.01, 140.02, and 141 were defined as the ROI. The Spokane MSA includes a larger population of people and includes the population within the ROI.

Social and Economic Condition. Fairchild AFB is approximately 12 miles west of Spokane, Washington, in Spokane County. Between 1990 and 2000, Washington's population increased by 21 percent. In the same period of time, the Spokane MSA and the ROI grew by 16 percent and 7 percent, respectively.

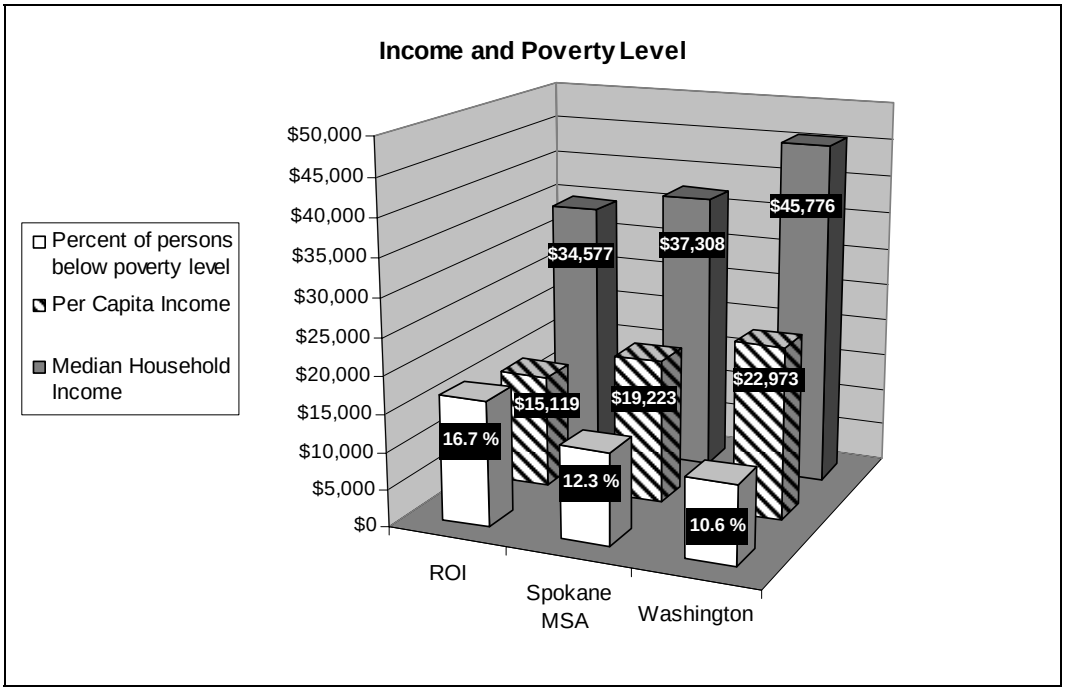
Table 3-5 lists the industries for residents in the ROI, MSA, and Washington. The top area of industry for the ROI and the MSA is educational, health, and social services. Public administration is the second highest area of industry for the ROI. A large percentage of residents in the MSA and Washington are employed by the manufacturing and retail trade industries. As would be expected, there is a larger portion of the population in the ROI employed in the Armed Forces, compared with both the MSA and Washington.

In 2000, the unemployment rate of the ROI (4.6 percent) was slightly higher than Washington (4.1 percent) but lower than the MSA (5.1 percent) (U.S. Bureau of Census 2000). As shown in **Figure 3-4**, the ROI has lower median household and per capita incomes and a higher percentage of individuals below the poverty threshold than both the MSA and Washington (U.S. Bureau of Census 2000).

Table 3-5. Employment of Residents in ROI, MSA, and the State of Washington

Economic and Social Indicators	ROI	MSA	State of Washington
Employed Persons in Armed Forces	12.0%	1.1%	1.0%
Employed Persons in Civilian Labor Force (by industry)			
Agriculture, forestry, fishing and hunting, and mining	0.7%	2.5%	0.9%
Construction	3.3%	7.0%	6.4%
Manufacturing	6.6%	12.5%	10.1%
Wholesale trade	2.2%	4.1%	4.6%
Retail trade	9.6%	12.1%	12.7%
Transportation and warehousing, and utilities	4.2%	5.4%	4.6%
Information	1.4%	3.4%	2.3%
Finance, insurance, real estate, and rental and leasing	6.1%	6.1%	7.1%
Professional, scientific, management, administrative, and waste management services	6.5%	9.8%	8.7%
Educational, health, and social services	34.8%	19.4%	8.7%
Arts, entertainment, recreation, accommodation, and food services	10.0%	7.9%	23.9%
Other services (except public administration)	4.1%	4.8%	5.7%
Public administration	10.3%	5.0%	4.7%

Source: U.S. Bureau of Census 2000



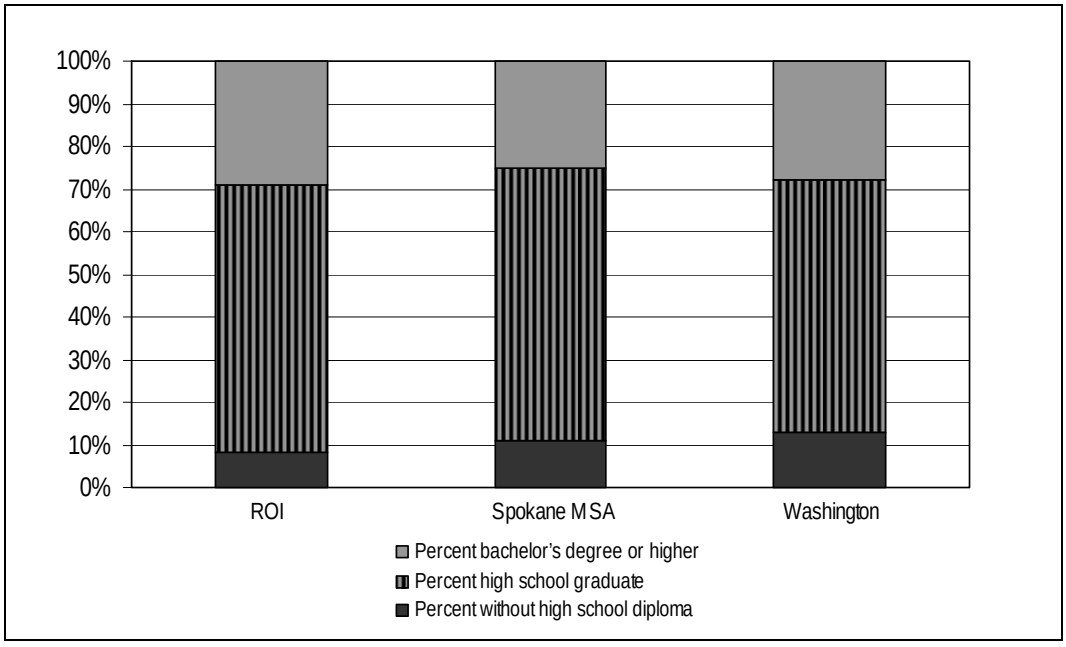
Source: U.S. Bureau of Census 2000

Figure 3-4. Income and Poverty Level for Residents in ROI, MSA, and the State of Washington

Figure 3-5 shows the educational attainment within the ROI, MSA, and Washington. The percent of residents in the ROI (62.7 percent) that have obtained a high school diploma is slightly lower than the MSA (64.1 percent) and slightly higher than Washington (59.4 percent). The percent of residents that have obtained a bachelor's degree or higher in the ROI (29.1 percent) is higher than the MSA (25.0 percent) and Washington (27.7 percent).

Environmental Justice. Race, ethnicity, and the poverty status of people within the ROI, MSA, and Washington were characterized to establish a baseline for environmental justice analysis. To establish a baseline for environmental justice effects, income, poverty, and race were examined at the census tract level and compared to the state and MSA averages. Census tracts having disproportionately low-income, high poverty levels, or high percentages of minorities are discussed in more detail to determine if environmental justice impacts could occur.

The five census tracts identified as the ROI (Tracts 138, 139, 140.01, 140.02, and 141) were compared to the MSA and the state of Washington. Tracts 138 (Fairchild AFB), 139 (southwest of the installation), and 140.01 and 140.02 (both southeast of the installation) are discussed in more detail because of their potential for environmental justice impacts. Tracts 138 and 139 had the highest populations of African Americans (7.9 and 3.7 percent, respectively) as compared to the MSA and Washington. Tracts 140.01 and 140.02 have the highest percentage of individuals below poverty level (35.8 and 24.4 percent, respectively) and Tract 140.01 has the lowest per capita income ($11,545) amongst the five tracts.



Source: U.S. Bureau of Census 2000

Figure 3-5. Educational Attainment for Residents in ROI, MSA, and the State of Washington

3.10 Infrastructure

3.10.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of

infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. The infrastructure components to be discussed in this section include the transportation network, electricity, natural gas, communications, water supply, sanitary systems and wastewater, and solid waste. All information on Fairchild AFB's infrastructure was taken from the General Plan (92 ARW 2005) and all information on the JPRA's infrastructure was taken from the JPRA Master Plan (FAFB 2005b).

The availability of landfills to support a population's residential, commercial, and industrial needs is integral in evaluating municipal solid waste (MSW). Alternative means of waste disposal might involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and are limited to, disposal of construction and demolition (C&D) debris. Recycling programs for various waste categories (e.g., glass, metals, and papers) reduce reliance of landfills for disposal.

3.10.2 Existing Conditions

Airfield. The Fairchild AFB airfield pavement system includes the runway, runway overruns, aircraft taxiways, aircraft parking aprons, and shoulders. Ancillary access roads leading to and from the flightline are also considered airfield pavements. In 2004, airfield pavements were evaluated by an HQ AMC team and found to range from adequate to critical with an overall rating of adequate. The runway was in good condition; however, some of the asphalt pavement on the runway shoulders, taxiways, and parking aprons were marginal. Airfield pavements do not represent a constraint to the future development of Fairchild AFB.

Within the past 5 years almost all of the airfield electrical systems (Precision Approach Path Indicator, airfield lighting vault, distance markers, and signage) have been replaced or upgraded, including the home run electrical circuits from the lighting vault, under the ramp, and out to the airfield. A new lighting system installed in 1998 featured a computer control system, new quartz lights, and new power cables. In 2001, runway centerline lighting was installed. However, many light systems are not correctly located and are out of compliance with AFIs. Some lighting system structures are nonfrangible airfield obstructions. Some of the taxiway lights are not flush with the pavement surface, and snow removal operations frequently damage the lights. Taxiway centerline lighting is missing. The runway edge lighting and other systems are not in compliance with AFIs. Finally, there are airfield obstructions that need to be relocated, eliminated, or marked with obstruction lights. The Fairchild AFB airfield lighting system was rated as degraded during the 2004 HQ AMC Infrastructure Assessment. However, the airfield lighting system does not represent a constraint to the future development of Fairchild AFB.

There is no airfield infrastructure on the JPRA.

Communications. The communications system at Fairchild AFB provides support to the 92 ARW, and its associate units. The communications system consists of fiber optic cable between buildings and twisted pair copper cable for in-building connectivity. Intrainstallation and interinstallation communications infrastructure exists above ground and below ground. Services and infrastructure are available to support a wide range of communications requirements and are capable of supporting voice, data, video, wireless, land mobile radio, aircraft communications, and security systems. Communications infrastructure does not represent a constraint to the future development of Fairchild AFB.

The communications system at JPRA consists of fiber optic cable and twisted pair copper cable. The fire alarm system consists of variable high speed (VHS) radio transceivers. Intrainstallation and interinstallation communications infrastructure exists above ground and below ground. Services and

infrastructure are available to support a wide range of communications requirements and are capable of supporting voice, data, video, and security systems.

Electrical. Fairchild AFB is fed electrical power by AVISTA Utility to two on-installation substations at 115 kilovolts (kV). The North and South Substations have three feeder circuits each, distributing power at 13.2-kV. The electrical system consists of the two 13.2-kV substations (north and south), power lines (both underground and overhead), high voltage switches, junction boxes, and transformers. The Bonneville Power Administration (BPA) conducts annual scheduled maintenance on the North and South substations. The June 2004 HQ AMC Infrastructure Assessment Team rated the system as adequate. In addition, the installation has adequate backup power systems to support priority facilities as outlined in the installation's contingency response plan, and authorized in AFI 32-1063. The electrical supply and distribution system does not represent a constraint to the future development of Fairchild AFB.

Primary electrical power on the JPRA is provided offsite by AVISTA from an overhead 13.2-kV line. Once onsite, the aboveground system is converted to an underground 13.2-kV radial distribution system that is owned by the government. The radial distribution system has three feeder lines. The long-range plan for JPRA is to convert the radial distribution system to a loop-feed configuration, which allows for redundancy and reliability. Studies have shown the highest demand load is around 240 kilowatts (kW). Based on anticipated loads for future buildings and existing demand loads, AVISTA has verified that there would be sufficient power to serve the facility with future expansion. In addition to primary power, there are two emergency/stand-by generator systems on the JPRA. These systems supply emergency power to existing buildings. With the proposed expansion of the JPRA, two new generator systems would be needed to serve future building plans.

Energy Management Control System (EMCS). The EMCS monitors and controls 14,996 items (individual measurements) on installation. More measurement points could be added as new buildings are constructed or existing facilities are modified. EMCS components vary in age from new to approximately 15 years old. There are two systems used by EMCS. Ultivist controls are in 102 buildings. All Energy Saving Performance Contract (ESPC) boilers use Invensys hardware. EMCS is also maintaining a Web page, for intranet use only, to better monitor the potable water system; boiler alarms; electric substations; and heating, ventilation and air conditioning (HVAC) air handler status. The June 2004 HQ AMC team rated the EMCS as adequate. The EMCS does not represent a constraint to the future development of Fairchild AFB.

Per Fairchild AFB standards, each building on the JPRA is to receive an EMCS system. Once online, this system would allow independent building control and reporting to a central monitoring station through the new communications infrastructure.

Heating and Cooling. The HVAC shop maintains 4,832,000 ft^2 of facilities with 3,457 tons of air conditioning. Under the ESPC, individual facility heating systems were installed in the 79 facilities formerly served by the Central Steam Plant. Work began in April 2002, and the Central Steam Plant was completely decentralized by November 2002. One small heating plant, the Deep Creek Steam Plant, remains in use serving three facilities of the AETC Survival School. When replacements for these facilities are built, they would have their own boilers. Propane is used for Buildings 11 and 12.

Fairchild AFB has no central cooling system. Cooling is supplied to individual facilities by chillers, air handling units, and air conditioning units. Recent EMCS upgrades have substantially improved the reliability of controls over HVAC equipment. The June 2004 HQ AMC Infrastructure Assessment Team's rating of the heating and cooling systems was adequate. The heating and cooling systems do not represent a constraint to the future development of Fairchild AFB.

The existing buildings at the JPRA have a mix of mechanical systems using propane, fuel oil, and electricity for heating. Buildings 1, 2, 3, and 8 are heated by fuel oil and Buildings 15 and 10 are heated by electricity. The Joint Integrated Intelligence Training Laboratory (JIITL) and the Joint Personnel Recovery Training Facility (JPRTF) are heated using propane. Propane is used for Buildings 11 and 12. Propane or natural gas would be the fuel source once existing buildings are renovated or replaced. Construction of a propane tank farm has been proposed to serve the Isolated Personnel Training Compound (IPTC) buildings. In addition, the system would be designed for future conversion from propane to natural gas, once natural gas becomes available on site.

Liquid Fuel. The installation liquid fuel system consists of a filtration house, a bulk storage tank farm with four tanks, a transfer system, two Type III hydrant-refueling systems with two operating tanks, a Type II hydrant-refueling system used by the 141 Air National Guard (ANG), a ground products storage system, and two GOV service stations. Fairchild AFB receives fuel by commercial pipeline and commercial tank truck. The June 2004 HQ AMC Infrastructure Assessment Team's rating of the complete liquid fuel system was degraded. The transfer system pumps are either broken or beyond economical repair and require replacement. New transfer filter separators and pump controls must be upgraded to modernize the pump controls. The hydrant fueling pits are new; however, the bulk petroleum, oils, and lubricants (POL) storage tanks and truck offload facilities require upgrading. The existing truck offload area does not comply with environmental standards. Aviation storage tanks need maintenance to prevent corrosion and leakage. If the fuel supply pipeline is disrupted, the truck offloading area is too small to handle a large volume of tanker traffic. Limited off-load capacity, coupled with the small storage capacity could create a bottleneck if the fuel supply pipeline is unavailable for a lengthy period.

There is no liquid fuel infrastructure at the JPRA.

Natural Gas. The natural gas system consists of natural gas lines, valves, vents, and meters. It was recently expanded to accommodate the decentralization of the installation's heat plant system. The system is owned in part by both the USAF and AVISTA Utilities. The government-owned natural gas lines are a mixture of polyethylene and steel piping. AVISTA performs all polyethylene pipe repairs including repairs to the government-owned lines. Steel piping is generally vintage 1960, while polyethylene pipe is generally less than 10 years old. The steel gas lines are protected from corrosion by a cathodic protection system. The HQ AMC Utilities Assessment conducted in June 2004 rated the natural gas system as adequate. The natural gas system does not represent a constraint to the future development of Fairchild AFB.

Natural gas is not readily available at JPRA. Currently, JPRA facilities are heated and cooled using either propane fuel or electricity. The long-range plan for JPRA is to use natural gas for heating and air-cooled chillers for cooling with individual boilers and chillers at each building. A cost analysis to bring natural gas to JPRA was developed and was determined to be economically unfeasible. However, to achieve the long-range plan of using natural gas, all new building systems are being designed to be convertible to natural gas once the fuel source becomes more economically available.

Sanitary Sewer. The sanitary sewer system is composed of the lateral lines from buildings and houses, lift stations, 628 sewer manholes, and 243,963 linear feet of sewer collection mains. The sewer flow meters are owned and maintained by the City of Spokane's Wastewater Department, which treats all of the wastewater from Fairchild AFB. Most of the installation sanitary sewer system is about 40 years old. The collection pipe joints and manhole connections have disintegrated with time, causing a groundwater infiltration problem. During periods of known high groundwater, flow to the City of Spokane's treatment plant increases by 200 percent, more than 2 million gallons per day (gpd). The contractual maximum

daily limit is 1 million gpd. The June 2004 HQ AMC Infrastructure Assessment Team's rating of the system was degraded. The major concern is the infiltration of groundwater.

Facilities on the JPRA are serviced by three septic systems and drain fields. The largest of the three drain fields is south of Newkirk Road on 11 acres of Federal property and was constructed to service Buildings 1, 2, 3, 8, and 11. A condition survey, conducted in June 2004, determined that the facility, if maintained properly, would support an additional sewer up to a maximum of 1,620 gpd. Currently, it is proposed that this system would be utilized to handle the sewage from the new IPTC facilities. The second septic system and drain field is east of Building 15. This system services only Building 15. Under the JPRA Master Plan, this existing system can continue to service Building 15 without modification or expansion and would meet the service needs for the projected building occupancy. The third onsite septic system, a Mounded Pressure Sand Filter, was constructed under the JPRTF project, and would service both Phase I and Phase II of the JPRTF.

Transportation Network. Fairchild AFB is approximately 12 miles west of the city of Spokane, Washington, on U.S. Route 2. Route 2 runs east-west to the north of the installation and provides the primary access to Fairchild AFB. Interstate Highway 90 (I-90) also runs east-west out of Spokane to the south of the installation. The road network on Fairchild AFB adequately meets the installation's needs. Mitchell Drive connecting to Bong Street and Fairchild Highway are the primary roads on Fairchild AFB. They act as arterial roads in moving traffic onto and off the installation. All other roads feed into these two primary roads.

Under normal security levels, the roads serving Fairchild AFB adequately handle traffic loads. Two areas that require attention are the entry gates and the intersection of Poplar Street and Mitchell Drive. The intersection of Poplar Street and Mitchell Drive does not work well during peak travel time in the afternoon with traffic departing the installation. There is no control device at the intersection, and traffic on Fairchild Highway, which services a major part of the installation, must wait for breaks in traffic along Mitchell Drive. The current design establishes a four-way intersection coming off Fairchild Highway at Poplar Road. Currently, the Federal, state, and county governments have no plans to make significant changes to this road network.

The JPRA is within a secure 45-acre compound known as White Bluff, which is approximately 10 miles north of Fairchild AFB, Washington. Lyons and Newkirk Roads provide the primary access to the compound through a gate near the southwestern corner of the property. Route 2 and I-90 run in an east-west direction south of the compound. The primary roads and parking areas on JPRA appear to be in serviceable condition. However, heaving due to severe weather conditions is apparent in some areas. Within the next 10 years, most of the existing paved roads would need to be resurfaced.

Under normal security levels, the roads serving JPRA adequately handle traffic loads. Parking is currently provided at or near each of the installation's buildings. However, not all of the parking areas are adequate to handle an increase in personnel with new facilities planned for construction. The new IPTC facility would require a two-lane roadway with shoulders, and proper signage to handle the increase in traffic. In addition, the entry gate requires redesign to incorporate AT/FP design features.

Water. The water supply and distribution system consists of the installation-owned potable transmission piping, booster pump stations, and water distribution system piping. Landscape irrigation systems are not included. At certain locations on the installation, the existing distribution system cannot meet irrigation peak demand plus fire flow. Additional storage is needed in the AETC Survival School area to meet fire flow requirements demand. In the AETC Survival School area, a single 12-inch polyvinyl chloride (PVC) pipe serves the entire complex. Also, sufficient quantities of fire flow water are not available to adequately protect AETC Survival School facilities. A new 300,000-gallon water storage tower is needed

in the AETC Survival School complex to provide minimum fire flow rates. The June 2004 HQ AMC Infrastructure Assessment Team rated the water supply and distribution system as degraded. The AMC Infrastructure Assessment Team recommended upgrading the water distribution system to solve fire flow and pressure problems, increasing water storage volume for fire flow, and pursuing additional connections with the city of Spokane Water System.

Water on the JPRA is supplied from a 730-foot deep well, which has a rated capacity of 68 gallons per minute, and a maximum daily flow rate of 97,920 gallons. Water from the well is pumped to a 65,000-gallon aboveground storage tank which serves the domestic and fire flow storage demand for Buildings 1, 2, 3, 8, 11, and 12 (JPRTF). Ten booster pumps feed water into the distribution system. A 6-inch water main that runs east-west conveys water to Buildings 1, 2, 3, 8, 11, and 15 to the east. Adjacent to Building 15 are two additional underground water storage tanks. These tanks are dedicated as backup for domestic and fire flow needs for the building. A 40,000-gallon tank is assigned for domestic water and a 30,000-gallon tank is assigned for fire flow.

Currently, Buildings 1, 2, 3, 8, and 11 are not equipped with sprinklers. According to Unified Facilities Criteria (UFC) 3-600-01, there is insufficient onsite water storage to service these buildings in the event of a fire. The Fairchild AFB Fire Marshall granted a waiver allowing the new JPRTF Phase I to tap into the existing distribution system, with the stipulation that Buildings 1, 2, 3, and 8 either be equipped with sprinklers or replaced with sprinkler facilities, or that the facility provide adequate onsite fire water storage capacity for the these buildings. Additional water storage would be required to meet the domestic, irrigation, and fire protection demands for the new IPTC and other future planned facilities. Preliminary calculations have determined that a 175,000-gallon tank would be sufficient to meet these demands and provide adequate onsite fire-water storage for Buildings 1, 2, 3, and 8.

Solid Waste. MSW at Fairchild AFB is managed in accordance with the guidelines specified in AFI 32-7042, *Solid and Hazardous Waste Compliance*. This AFI incorporates by reference the requirements of Subtitle D, 40 CFR Parts 240 through 244, 257, and 258; and other applicable Federal regulations, AFIs, and DOD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention.

Fairchild AFB operates a solid waste-recycling program with a full-service recycling center in Building 2420, accepting a wide variety of materials, including household hazardous waste. The Recycle Center also has a Household Hazardous Material Exchange Shelf where personnel can pick up or drop off usable household materials such as paint, cleaners, automotive products, and a variety of other household chemicals at no cost. Containers can be dropped off using the drive-through 24 hours per day/7 days per week.

Fairchild AFB has a contract for solid waste pick-up and disposal of all refuse on the installation, with Waste Management of Spokane Washington. The contractor removes refuse from Fairchild AFB properties and transports the solid waste to either the Spokane Regional Waste to Energy Facility or Graham Road Landfill. Yard waste is also taken to the Waste to Energy Facility, where it is then transported to a regional composting facility. Waste is collected in dumpsters placed throughout the installation and then removed. Currently, there are no operating landfills at Fairchild AFB. In Fiscal Year (FY) 2002, Fairchild AFB disposed 1,483 tons of nonhazardous MSW (92 CES/CEV 2005).

An average of 315 tons is collected and transported every month to the Spokane Regional Waste to Energy Facility or the ”limited purpose” landfill at Graham Road Landfill in Medical Lake, Washington.

When materials do not meet criteria for thermal processing disposal at the Waste to Energy Facility, the solid waste goes to the landfill.

C&D waste generated from specific construction, renovation, and maintenance projects on Fairchild AFB, most of which are performed by off-installation contractors, is the responsibility of the contractor. Contractors are required to comply with Federal, state, local, and USAF regulations for the collection and disposal of MSW from the installation. Much of this material can be recycled or reused, or otherwise diverted from landfills. All nonrecyclable C&D waste is collected in a dumpster until removal. C&D waste contaminated with hazardous waste, asbestos-containing material (ACM), lead-based paint (LBP), or other undesirable components is managed in accordance with AFI 32-7042.

The JPRA follows the same Solid Waste Management Program as Fairchild AFB.

3.11 Hazardous Materials and Waste

3.11.1 Definition of the Resource

AFPD 32-70, *Environmental Quality*, establishes the policy that the USAF is committed to

- Cleaning up environmental damage resulting from its past activities
- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Responsibly managing the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible.

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that could cause an increase in mortality, serious irreversible illness, or incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

Evaluation of hazardous materials and waste focuses on underground storage tanks (USTs) and aboveground storage tanks and the storage, transport, and use of pesticides and herbicides; fuels; and POLs. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous waste when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well being of wildlife species, botanical habitats, soil systems, and water resources. In the event of a release of hazardous materials or wastes, the extent of contamination varies based on type of soil, topography, and water resources.

Special hazards are those substances that might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are ACM, radon, LBP, polychlorinated biphenyls, and UXO. The presence of special hazards or controls over them might affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Act (SARA) and Toxic Substances Control Act (TSCA)

define hazardous materials. The Solid Waste Disposal Act, as amended by RCRA, which was further amended by Hazardous and Solid Waste Amendment (HSWA), defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity; concentration; or physical, chemical, or infectious characteristics, could present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through Fairchild AFB's ERP, DOD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the migration of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

3.11.2 Existing Conditions

Hazardous Materials. AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who manage, monitor, or track any of those activities. Hazardous and toxic material procurements at Fairchild AFB are approved and tracked by the installation hazardous material management process team. The Environmental Management Office at Fairchild AFB supports and monitors environmental permits, hazardous material and hazardous waste storage, and spill prevention and response (92 ARW/CC 2003).

Hazardous Waste. The 92 ARW maintains a Hazardous Waste Management Plan as directed by AFI 32-7042, *Solid and Hazardous Waste Compliance* (92 ARW/CC 2003). This plan prescribes the roles and responsibilities of all members of Fairchild AFB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management.

Wastes generated at Fairchild AFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, MSW, and other miscellaneous wastes. Management of hazardous waste is the responsibility of each waste-generating organization and 92d Civil Engineering Squadron. Fairchild AFB produces more than 1,000 kilograms of hazardous waste per month and is considered a large-quantity hazardous waste generator. There are 18 satellite accumulation points on installation and one 90-day accumulation site. A contracted waste transporter picks up the waste containers from the 90-day accumulation site and transports them to an off-installation licensed Treatment, Storage, and Disposal Facility (92 ARW/CC 2003).

Pollution Prevention. AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*; and EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. The 92 ARW fulfills this requirement with the following plans:

- Integrated Solid Waste Management Plan (92 CES/CEV 2005)
- Storm Water Pollution Prevention Plan (92 CES/CEV 2000)

- Hazardous Waste Management Plan (92 ARW/CC 2003)
- Hazardous Material Emergency Planning and Response Plan (92 ARW 1999)
- Pollution Prevention Management Action Plan (FAFB 2000)
- Underground Storage Tank Management Plan (FAFB 2001b)

These plans ensure that Fairchild AFB maintains a waste-reduction program and meets the requirements of the CWA; the NPDES permit program; and Federal, state, and local requirements for spill prevention control and countermeasures.

Asbestos-Containing Materials. AFI 32-1052, *Facilities Asbestos Management*, provides the direction for asbestos management at USAF installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires installations to develop an asbestos management plan for the purpose of maintaining a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by USEPA with the authority promulgated under OSHA, 29 U.S.C. 669 et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Building materials in older buildings are assumed to contain asbestos. It exists in a variety of forms and can be found in floor tiles, floor tile mastic, roofing materials, joint compound used between two pieces of wallboard, some wallboard thermal system insulation, and boiler gaskets. If asbestos is disturbed, fibers can become friable. Common sense measures, such as avoiding damage to walls, will keep the fibers from becoming airborne and hazardous. The ACMs are removed in conjunction with other building renovation and alteration projects.

Asbestos at Fairchild AFB is managed in accordance with their Asbestos Management Plan that is updated annually. This plan specifies procedures for the removal, encapsulation, enclosure, and repair activities associated with ACM-abatement projects. In addition, it is designed to protect personnel who live and work on Fairchild AFB from exposure to airborne asbestos fibers as well as to ensure the installation remains in compliance with Federal, state, and local regulations pertaining to asbestos (92 ARW 2005).

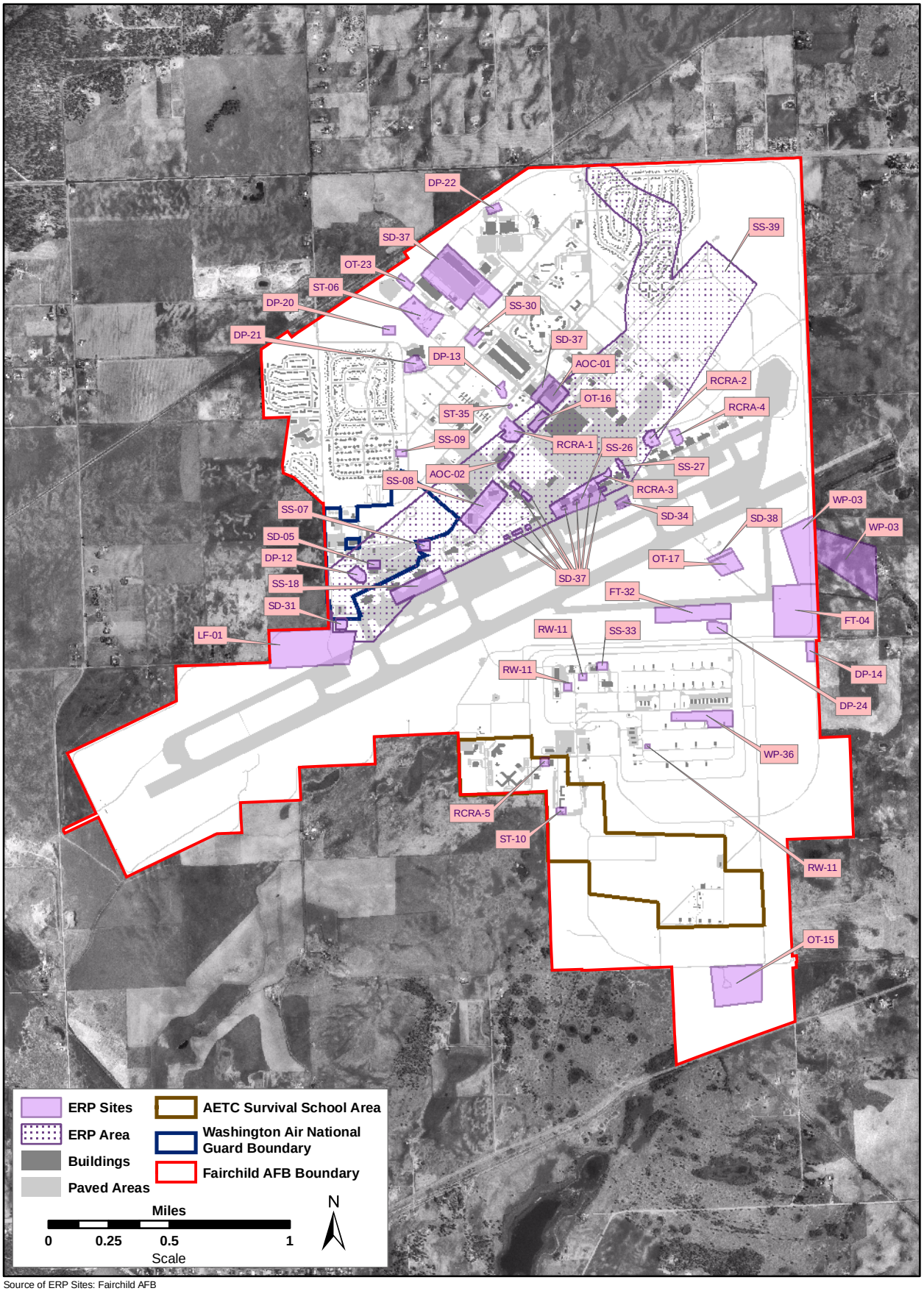
Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on October 28, 1992, regulates the use and disposal of LBP on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to LBP activities and hazards.

USAF policy and guidance establishes LBP management at USAF facilities. The policy incorporates by reference the requirements of 29 CFR 1910.120, 29 CFR Part 1926, 40 CFR 50.12, 40 CFR Parts 240 through 280, the CAA, and other applicable Federal regulations. In addition, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating LBP hazards. LBP at Fairchild AFB is managed in accordance with the *Lead Exposure and Lead-Based Paint Management Plan* and is updated annually (92 ARW/CEV 2003). The plan is designed to establish management responsibilities and procedures for identifying and controlling hazards related to the presence of LBP. The plan addresses organizational roles and responsibilities, program development, management actions, data management, and training.

Environmental Restoration Program. The ERP, formerly known as the Installation Restoration Program, is a subcomponent of the Defense ERP that became law under SARA. The ERP requires each DOD installation to identify, investigate, and clean up hazardous waste disposal or release sites.

The ERP at Fairchild AFB began in 1984 with an installationwide Preliminary Assessment/Records Search that identified 15 ERP sites for further investigation. In 1989, Fairchild AFB was placed on USEPA's National Priorities List (NPL), a list of sites that are considered to be of special interest and require immediate attention (NPL 2004). Site assessments and investigations in the late 1980s and 1990s added sites to the Fairchild AFB clean up program.

Figure 3-6 shows the location of the contaminated sites on Fairchild AFB. Currently, 19 ERP sites are closed under No Further Action or No Further Remedial Action Planned, 7 are expected to be No Further Action, 9 are under remediation, and 2 are under investigation. The sites include spill areas, drainage areas, landfills, storage tanks, fire training areas, and radioactive waste sites. Primary contaminants in soil and water include waste solvents, fuels, dissolved phase fuels and solvents, and low-level radiation waste. Seventeen ERP sites have associated institutional or land use controls. Plans for future development in the areas of any of the ERP sites should take into consideration the possible restrictions and constraints that they represent (92 ARW 2005).



Source of ERP Sites: Fairchild AFB

Figure 3-6. Environmental Restoration Program Sites at Fairchild AFB

4. Environmental Consequences

This section contains four subsections. **Section 4.1** provides a general introduction to the environmental consequences analysis, including significance criteria for each resource area. **Section 4.2** presents the No Action Alternative, which is prescribed by CEQ regulations. **Section 4.3** provides a general analysis of the environmental consequences analysis by resource area. **Section 4.4** provides the detailed analysis of the Proposed Action, as presented in **Section 2.1**. Potential cumulative effects that occur as a result of implementing the Proposed Action and other past, present, or reasonably foreseeable projects are in **Section 5**.

4.1 Introduction

The intention of this section of the IDEA is to present both a general analysis of the environmental effects of installation development activities (**Section 4.3**), as well as a summary of site-specific environmental effects of individual installation development projects (**Section 4.4**). The general analysis identifies the environmental effects on each resource area of the ongoing demolition, construction, and infrastructure upgrade activities, with a focus on avoiding those areas that are constraints to development. However, a general analysis of potential development activities alone does not provide the framework to adequately assess the potential environmental consequences of a single proposed project. Therefore, the analysis in **Section 4.4** presents a detailed analysis of the representative demolition, construction, and infrastructure upgrades introduced in **Sections 2.1.2**, **2.1.3**, and **2.1.4**, respectively, to provide a range of potential consequences that could be expected from implementing the proposed projects with the greatest potential for adverse environmental effects. The representative projects were selected for detailed analysis because they are large in scale or have a unique aspect (e.g., proposed location or operational characteristics) with the potential to result in adverse environmental effects. In addition, **Section 4.4** contains a summary for all projects identified over the next 5 years at Fairchild AFB (refer to **Appendix A**) in tabular form. The analysis presented in **Sections 4.3** and **4.4** provides the basis for the cumulative effects analysis in **Section 5**. The No Action Alternative is presented in **Section 4.2** before the Proposed Action in order to provide a comparison of the potential environmental consequences of implementing the Proposed Action against no action.

The specific criteria for evaluating potential environmental effects of the No Action Alternative or Proposed Action are described in the following text, identified by resource area. The significance of an action is also measured in terms of its context and intensity. The context and intensity of potential environmental effects are described in terms of duration, directivity, magnitude, and qualification:

- ***Short-term or long-term.*** In general, short-term effects are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term effects are those that are more likely to be persistent and chronic.
- ***Direct or indirect.*** A direct effect is caused by an action and occurs around the same time at or near the location of the action. An indirect effect is caused by an action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action.
- ***Minor, moderate, or significant.*** These relative terms are used to characterize the magnitude or intensity of an impact. A minor effect is slight, but detectable. A moderate effect is readily apparent. Significant effects are those that, in their context and due to their magnitude (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for

mitigation in order to fulfill the policies set forth in NEPA. Significance criteria by resource area are presented in the following text.

- ***Adverse or beneficial.*** An adverse effect is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial effect is one having positive outcomes on the man-made or natural environment.

The following text presents the criteria that would constitute a significant environmental effect resulting from implementation of the No Action Alternative (see **Section 4.2**), or the Proposed Action (either general demolition and construction activities as presented in **Section 4.3**, or any specific project as presented in **Section 4.4**). The same significance criteria are also applied to potential cumulative effects (see **Section 5**) of implementing the Proposed Action in conjunction with past, present, or reasonably foreseeable future actions.

Noise

Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise effects are evaluated quantitatively and qualitatively. Specific criteria for whether an action would be considered a significant adverse noise effect are as follows:

- New residential land uses being brought into the 65-DNL contour
- Areas within the 65-DNL contour increasing by more than 1.5 DNL
- Areas deemed by Federal or state regulation, or by local ordinance to be noncompatible with noise levels above a certain level become within the contour for that level.

Land Use

The significance of potential land use effects is based on the level of land use sensitivity in areas affected by a proposed action and the compatibility of proposed actions with existing conditions. In general, a land use effect would be significant if it were to

- Be inconsistent or noncompliant with existing land use plans or policies
- Preclude the viability of existing land use
- Preclude continued use or occupation of an area
- Be incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflict with planning criteria established to ensure the safety and protection of human life and property.

Air Quality

The environmental consequences to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the effect in NAAQS attainment areas, such as Fairchild AFB, would be considered significant if the net increases in pollutant emissions from the Federal action would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of 10 percent or more in an affected AQCR emissions inventory
- Exceed any Evaluation Criteria established by a SIP.

In addition to the *de minimis* emissions thresholds, Federal PSD regulations define air pollutant emissions to be significant if the source is within 10 kilometers of any Class I area, and emissions would cause an increase in the concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21(b)(23)(iii)). As stated in **Section 3.3.1**, there are no Class I areas within 10 kilometers of Fairchild AFB, so this significance criterion was not used for this analysis.

Safety

Any increase in safety risks would be considered an adverse effect on safety. An effect would be significant if an action were to substantially increase risks associated with the safety of construction personnel, contractors, or the local community; substantially hinder the ability to respond to an emergency; or introduce a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place.

Geological Resources

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be significant if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function (including prime farmland and other unique soils) within the environment.

Water Resources

Evaluation criteria for impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. A proposed action would have significant effects on water resources if it were to do one or more of the following:

- Substantially reduce water availability or supply to existing users
- Overdraft groundwater basins
- Exceed safe annual yield of water supply sources
- Substantially affect water quality adversely
- Endanger public health by creating or worsening health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations adopted to protect water resources.

The potential effect of flood hazards on a proposed action is important if such an action occurs in an area with a high probability of flooding.

Biological Resources

The significance of effects on biological resources is based on

- The importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- The proportion of the resource that would be affected relative to its occurrence in the region
- The sensitivity of the resource to proposed activities
- The duration of ecological ramifications.

Effects on biological resources would be significant if species or habitats of high concern are adversely affected over relatively large areas. Effects would also be considered significant if disturbances cause reductions in population size or distribution of a species of high concern.

Ground disturbance and noise associated with construction can directly or indirectly cause adverse effects on biological resources. Direct impacts from ground disturbance are evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Habitat removal and damage or degradation of habitats might be adverse effects associated with ground-disturbing activities.

As a requirement under the ESA, Federal agencies must provide documentation that ensures that agency actions will not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project. The "take" of a federally protected species under the ESA would be considered significant.

The significance of effects on wetland resources is proportional to the functions and values of the wetland complex. Quantification of wetlands functions and values, therefore, is based on the ecological quality of the site as compared with similar sites, and the comparison of the economic value of the habitat with the economic value of the proposed activity that would modify it. A significant adverse effect on wetlands would occur should either the major function or value of the wetland be substantially altered.

Cultural Resources

Adverse effects on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

Socioeconomics and Environmental Justice

Construction expenditures are assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates 10

employment positions might go unnoticed in an urban area, but could have considerable impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or a decrease in regional spending or earning patterns, those effects would be considered adverse. A proposed action could have a significant effect with respect to the socioeconomic conditions in the surrounding ROI if it were to

- Change the local business volume, employment, personal income, or population that exceeds the ROI's historical annual change
- Adversely affect social services or social conditions, including property values, school enrollment, county or municipal expenditures, or crime rates
- Disproportionately impact minority populations or low-income populations.

Infrastructure

Effects on infrastructure are evaluated based on their potential for disruption or improvement of existing levels of service and additional needs for energy and water consumption, sanitary sewer and wastewater systems, and transportation patterns and circulation. Impacts might arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to installation activities. In considering the basis for evaluating the significance of impacts on solid waste, several items are considered. These items include evaluating the degree to which the proposed construction projects could affect the existing solid waste management program and capacity of the area landfill. An effect might be considered adverse if a proposed action exceeded capacity of a utility.

Hazardous Materials and Waste

Effects on hazardous materials and waste management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and state regulations, or increased the amounts generated or procured beyond current Fairchild AFB waste management procedures and capacities. Effects on pollution prevention would be considered significant if the Federal action resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Effects on the ERP would be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse effects on human health or the environment. Effects on fuels management would be significant if the established management policies, procedures, and handling capacities could not accommodate the proposed activities.

4.2 Environmental Consequences of the No Action Alternative

Under the No Action Alternative, Fairchild AFB would not implement the projects proposed in the installation's community of plans, which would result in the continuation of the existing condition, as described in **Section 3**. No direct environmental effects would be expected on the noise environment, land use, air quality, safety, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, infrastructure, and hazardous materials and wastes. It is anticipated that future development would occur under the No Action Alternative, but those development projects would be analyzed through preparation of individual NEPA documents, as appropriate.

4.3 General Environmental Consequences by Resources Areas

4.3.1 Noise

Intermittent short-term minor adverse impacts from noise would be expected from the implementation of the Proposed Action.

Construction Noise. Building construction, modification, and demolition work can cause noise emissions above ambient sound levels. A variety of sounds come from graders, pavers, trucks, welders, and other work processes. **Table 3-1** lists noise levels associated with common types of construction equipment that are likely to be used under the Proposed Action. Since a typical urban neighborhood is usually around 60 to 70 dBA, noise emissions from construction projects can cause short-term, adverse impacts.

Projects under the Proposed Action would require grading, paving, demolition, and building construction. All of the projects under the Proposed Action would occur on Fairchild AFB property. Some of these would occur close to on-installation military housing.

Construction noise varies depending on the type of construction being done, the area that the construction would occur in, and the distance from the source. Under the Proposed Action, the majority of projects are proposed on the northern and southern sides of the installation. Residents could experience noise in the 70-dBA range for those several hundred feet away and in the mid 80-dBA range for those adjacent to the project site. Examples of expected construction noise are as follows:

- Residents living on the east side of the installation (approximately 500 feet away) would experience noise levels of 69.1 dBA during the paving of roads and parking lots near them. These residents would also experience noise levels of 69.8 dBA during demolition of Building 350 and 72.4 dBA during the construction of new facilities on that site.
- Residents in the area to the northeast of the installation (approximately 3,000 feet away) would experience noise levels of 53.6 dBA during any paving operations near the Civil Engineering (CE) complex. These same residents would experience noise levels of 54.2 dBA during demolition of those buildings, and 56.8 dBA during construction of new facilities at those sites.

Given the extent of the projects under the Proposed Action and the proximity to residents on the installation, adverse effects from construction noise are unavoidable. However, noise generation would last only for the duration of construction activities, and could be reduced through the use of equipment exhaust mufflers and restriction of construction activity to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). It is not anticipated that the short-term increase in ambient noise levels from the Proposed Action would cause significant adverse effects on the surrounding populations.

Operational Impacts. Once the projects under the Proposed Action are completed, the ambient noise level would return to its normal level. It is not anticipated that vehicle traffic or aircraft operations would increase under the Proposed Action. No long-term effects on the ambient noise level are anticipated as a result of the Proposed Action.

4.3.2 Land Use

No short-term or long-term effects would be expected to occur on land use. Each project would be sited in accordance with the land use categories defined in the Fairchild AFB General Plan (92 ARW 2005). The Proposed Action would occur entirely on Fairchild AFB property. Proposed demolition projects

would make some land available for proposed construction projects, which are all identified in **Appendix A**.

Specific area improvements have the potential of either increasing or decreasing the amount of area available for future development. The following list outlines the specific land use categories (see **Figure 2-1**) and their current and future land use requirements, as well as identifying the acreage left available for future projects. Future projects would increase the acreage of used land on-installation to 2,641 acres. This leaves a total of 359 acres available for future development.

- ***Airfield, Industrial, and Training.*** Three long-range development options are described in **Section 5** of the Fairchild AFB General Plan (92 ARW 2005). Each would have a different impact on airfield land use patterns. Two new maintenance hangars are planned for areas along the flightline. Industrial areas would not be expected to have significant land use changes.
- ***Community.*** Current community land use areas would not experience significant changes under the Proposed Action. Any new community facilities should be developed in the two current community areas.
- ***Administration.*** Presently activities supporting administrative functions occupy 63 acres. New construction planned for development would require 78 acres.
- ***Housing.*** Unaccompanied housing would increase with the addition of new dormitories. Accompanied housing would be reduced by 399 units according to the latest Fairchild AFB Housing Requirement Market Analysis. This would allow an additional 84 acres for future development.
- ***Outdoor Recreation.*** Limited changes would occur to the outdoor residential areas. Open space would be increased by the demolition of Buildings 732, 750, and 795.

The future development plans for Fairchild AFB would make available the acreage required for future missions and new construction and use of these areas would be in compatible land use areas.

No off-installation residential areas would be permanently affected in a significant manner, nor would any other noncompatible land use. On-installation housing would hold new employees that would be required by the Proposed Action. Therefore, no areas off Fairchild AFB would need to be rezoned as residential to house personnel from Fairchild AFB. None of the land use significance criteria are met by the Proposed Action, and no significant effects would be expected.

4.3.3 Air Quality

The Proposed Action would generate both temporary and long-term air pollutant emissions. The construction, demolition, and infrastructure projects related to the Proposed Action would generate air pollutant emissions as a result of grading, filling, compacting, trenching, demolition, and construction operations, but these emissions would be temporary and would not be expected to generate any off-site effects. The Proposed Action does not include a net increase in personnel or commuter vehicles. Therefore, the Proposed Action's emissions from existing personnel and commuter vehicles would not result in an adverse impact on regional air quality. Regulated pollutant emissions from the Proposed Action would not contribute to or affect local or regional attainment status with the NAAQS.

The construction projects would generate total suspended particulate and PM_{10} emissions as fugitive dust from ground-disturbing activities (e.g., grading, demolition, soil piles) and from combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day to day depending on the construction phase, level of activity, and

prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity.

Fugitive dust emissions for various construction activities were calculated using emissions factors and assumptions published in USEPA's AP-42 (USEPA 2006). These estimates assume that 230 working days are available per year for construction (accounting for weekends, weather, and holidays).

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment, as well as evaporative emissions from architectural coatings and asphalt paving operations. These emissions would be of a temporary nature. The emissions factors and estimates were generated based on guidance provided in USEPA AP-42 (USEPA 2006).

Since Fairchild AFB is in attainment for all criteria pollutants, General Conformity Rule requirements are not applicable. In addition, the Proposed Action would generate emissions well below 10 percent of the emissions inventory for the EWNII AQCR and the emissions would be short-term. Therefore, the demolition or construction activities associated with the Proposed Action would not have significant effects on air quality at Fairchild AFB or on regional or local air quality. **Appendix D** shows an example of how air emissions are calculated. **Section 4.4** discusses project-specific emissions in more detail.

Operational emissions associated with the Proposed Action would not be expected to result in adverse effects on air quality. Day-to-day operations associated with the Proposed Action would generate emissions of criteria pollutants as combustion products from the burning of natural gas by boilers used to provide comfort heating as well as the combustion of fuel oil by emergency generators to produce electrical power, but these emissions would typically be offset by the removal of older and more emissive equipment. In addition, local and regional pollutant effects resulting from direct and indirect emissions from stationary emissions sources under the Proposed Action would result in no new impacts on air quality as the same quantities of hazardous emitting chemical used under the existing procedures would be the same for new facilities and procedures. Any other project for the future out years that would involve new or additional emissions would be addressed through Federal and state permitting program requirements under NSR regulations (40 CFR Parts 51 and 52).

4.3.4 Safety

Short-term minor direct adverse effects would be expected from the Proposed Action. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at Fairchild AFB during the normal workday because the level of such activity would increase. Contractors would be required to establish and maintain safety programs. Projects associated with the Proposed Action would not pose a safety risk to installation personnel or activities at the installation. The proposed construction projects would enable 92 ARW to meet future mission objectives at the installation and conduct or meet mission requirements in a safe operating environment.

During construction activities associated with the Proposed Action, construction workers would have a possibility of encountering UXO or CAIS. An ERP waiver approved by HQ AMC is required prior to accomplishing any work on or near a range. 92 CES/CEV staff should be contacted prior to commencement of construction activities to determine if an ERP waiver is required for the Proposed Action for all proposed work on or near range sites and for safety requirements that would need to be followed during construction.

4.3.5 Geological Resources

Topography. Negligible to minor adverse effects on the natural topography would be expected as a result of demolition, site preparation, and construction under the Proposed Action. The majority of the Proposed Action project sites would occur in areas that were disturbed as a result of past installation activities.

Geology. Negligible to minor adverse effects on geological resources resulting from construction and demolition activities (i.e., grading, excavating, and recontouring of the soil) would be expected as a result of implementing the Proposed Action. The geology of each previously undisturbed site would be directly impacted from site preparation activities and the construction of access roads and parking facilities. However, the locations of the demolition facilities in the Proposed Action would make land space available, minimizing the area of undisturbed land required for new sitings. Therefore negligible to minor adverse effects on previously undisturbed geologic features would be expected from the Proposed Action.

Soils. Minor to negligible short- and long-term adverse effects on soils would be expected as a result of the construction of new facilities under the Proposed Action. Construction and demolition activities would be expected to directly impact the soils as a result of grading, excavation, placement of fill, compaction, mixing, or augmentation necessary to prepare the sites for development. Additional adverse effects could occur as a result of erosion and associated sedimentation during construction, especially in areas where vegetative cover was removed during site development. Development of access roads and parking areas to accommodate the new facilities would likely result in a total disturbed area of greater than 1 acre. Construction projects would add impervious land mass, which would increase the risk for storm water runoff. However, implementation of erosion and sediment control and storm water best management practices (BMPs) implemented consistent with NPDES Phase II permit requirements, the installation SWPPP, and other applicable codes and ordinances would minimize the potential for adverse effects resulting from erosion and transport of sediments in storm water runoff.

All construction projects would implement BMPs to limit potential impacts resulting from construction activities. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, which would reduce the total amount of soil exposed to potential suspension and wind erosion. Implementation of standard erosion-control practices (e.g., silt fencing, sediment traps, application of water sprays, phased construction, and prompt revegetation of disturbed areas) would also reduce potential impacts related to soil erosion and associated sedimentation.

No impacts on prime or unique farmland would occur as a result of implementing the Proposed Action. There is no prime farmland on Fairchild AFB. It is likely the locations of proposed development would be in areas that are mapped as Urban Land. By definition, prime farmland has to be available for farming and cannot occur in areas designated as Industrial Land.

4.3.6 Water Resources

Short-term direct minor adverse effects on surface water and groundwater would be expected as a result of construction activities associated with the Proposed Action. Long-term indirect minor adverse effects on surface water and groundwater quality would be expected as a result of the increase of impervious surfaces. Increases in impervious surfaces would change peak flow runoff, divert runoff to storm drains, and reduce runoff and infiltration of natural surfaces which reduce shallow groundwater recharge over time. If changes in peak flow runoff occur, the lessened groundwater recharge would have a long-term indirect effect on the water supply for the West Plains community (of unknown proportions). Groundwater supply is a concern in this community particularly as development adjacent to Fairchild AFB increases. A study of Fairchild AFB's watershed is being conducted to look at ways of

increasing recharge to offset the current demand. The water supply is sufficient for the Fairchild AFB population and the Proposed Action would not result in any increase in installation population. The majority of the water supply for Fairchild AFB is delivered from the Latah Creek Aquifer and the Spokane River. Changes in local groundwater as a potential result of the Proposed Action would not affect the water supply at Fairchild AFB. A backup well, along the eastern boundary of Fairchild AFB, extracts water from the local aquifer which would be affected by lower potential recharge as a result of the Proposed Action.

Groundwater. The activities associated with the Proposed Action would have negligible adverse effects on groundwater quality. Implementation of storm water and spill prevention BMPs developed consistent with the SWPPP and other applicable codes and ordinances would minimize potential runoff or spill-related impacts on groundwater.

Surface Water. Implementation of the Proposed Action is expected to have negligible to minor adverse effects on surface water and surface water quality. Adherence to proper engineering practices and implementation of erosion and sediment control and storm water BMPs developed consistent with the SWPPP (regulated by the WDOE) and other applicable codes and ordinances would minimize runoff-related impacts and the potential for adverse effects on surface water quality. There are no natural free-flowing streams or natural fluvial topography on the main installation, therefore no impacts would be expected. A negligible to minor increase in the conveyance of nonpoint source pollutants in runoff to storm water ditches and wetlands on the installation could occur in association with C&D activities. BMPs would be used to minimize impacts to wetlands.

Development of the Proposed Action would result in an increase of impervious surfaces, including the development of access roads and parking areas to accommodate the new facilities. Storm water management controls would be designed and implemented consistent with NPDES Phase II permit requirements and the SWPPP to minimize potential adverse effects on surface waters associated with the increased impervious surfaces.

Floodplain. In accordance with EO 11988, construction activities in the 100-year floodplain must be avoided. There is no mapped 100-year floodplain at Fairchild AFB due to the small size of streams on the installation. Any construction activities within the 100-year floodplain, should it be delineated in the future, would require approval from HQ AMC and separate NEPA analysis. The Water System Annex 1 is on the Spokane River and the 100-year floodplain elevation at Clear Lake Recreation Facility is considered to be 2,350 feet. In complying with Spokane County Ordinance 88-0521 and EO 11988, no further development of the Water System Annex 1 is planned and there are no new projects planned within the 100-year floodplain at the Clear Lakes Recreation Facility.

4.3.7 Biological Resources

The Proposed Action would result in short- and long-term minor adverse effects on biological resources. Fairchild AFB has an INRMP that contains detailed information about biological resource management. Under the Proposed Action, all projects would be implemented in accordance with the guidelines set forth in the INRMP.

Vegetation. Short- and long-term minor adverse effects on vegetation would occur as a result of construction associated with the Proposed Action. The majority of projects associated with the Proposed Action would occur in the improved areas of Fairchild AFB, which would primarily affect landscaped species. The possible removal of trees would create a long-term adverse effect on vegetation. Following construction, disturbed areas would be landscaped in accordance with Fairchild AFB standards.

Wildlife. Short-term minor adverse effects on wildlife would occur as a result of construction noise and minor loss of habitat associated with the Proposed Action. The majority of projects associated with the Proposed Action would occur in improved areas of Fairchild AFB that are not considered good wildlife habitat. Birds, mammals, and reptiles that occur at the installation might visit these areas, but are likely to spend the majority of their time in the undeveloped portions. Therefore the effects of construction noise and heavy equipment use would be slightly adverse in the short-term. However, wildlife affected by noise would quickly recover once the construction noise ceased.

Threatened and Endangered Species. No adverse effects on Federal- or state-listed species would be expected to occur as a result of implementing the Proposed Action. Developed portions of the installation are not expected to provide suitable habitat for Federal- or state-listed threatened or endangered species. The USFWS reported that the following federally threatened vegetation species have the potential to occur in the vicinity of Fairchild AFB (FAFB 2005b): Ute ladies' tresses (*Spiranthes diluvialis*), water howellia (*Howellia aquatilis*), and Spalding's catchfly (*Silene spaldingii*). Ute ladies' tresses are also state-listed as endangered and water howellia and Spalding's catchfly are each state-listed as threatened. Spalding's catchfly and water howellia are federally listed species known to occur or have the potential to occur within the vicinity of Fairchild AFB, satellite installations, and the JPRA. In addition, *Juncus uncialis*, *Pilularia americana*, and *Sclerolinon digynum* are listed as sensitive or threatened by Washington state and are associated with vernal pools on Fairchild AFB. Spalding's catchfly and its associated habitat are protected on Fairchild AFB (see **Figure 3-2**). No activities under the Proposed Action are within the area known to support threatened or endangered species on Fairchild AFB, therefore no adverse effects would be expected.

There would be no adverse effects on listed avian species that are passing through Fairchild AFB, protected under the Migratory Bird Treaty Act, because no construction activities would occur in prairie, wetlands, streams, woodlands, or other areas that are considered suitable habitat.

Wetlands. In accordance with EO 11990, *Protection of Wetlands*, the USAF must demonstrate that there are no practicable alternatives to construction within wetlands. There are approximately 174 acres of wetlands on Fairchild AFB (see **Figure 2-2**), which are primarily in the less developed areas of the installation. The USAF avoids military operations in wetlands, where possible.

There are no C&D activities proposed on wetlands, therefore no effects to wetlands are expected under the Proposed Action. Construction activities adjacent to wetlands could result in adverse effects because of erosion and sedimentation. Standard BMPs (as described under **Section 4.3.6**, Water Resources) would be applied to control sediment and runoff to protect wetlands from indirect adverse effects. Future projects that could affect wetlands are not analyzed in this EA. If a proposed project is relocated into a wetland, then that project would require approval from HQ AMC and additional NEPA analysis.

4.3.8 Cultural Resources

The Proposed Action could result in minor to major adverse effects on cultural resources, either through demolition or alteration of eligible buildings or structures on the installation, demolition of buildings considered to be contributing elements to historic districts, construction of new elements within historic districts, or through inadvertent discovery and damage to previously unrecorded archeological resources. Beneficial long-term effects on architectural resources would also be expected by preventing deterioration. Fairchild AFB has an ICRMP that contains detailed information about cultural resource management and the plans that are in place in the event of archeological discoveries. Under the Proposed Action, all projects would be implemented in accordance with the guidelines set forth in the ICRMP.

Archeological Resources. There are no known potential pre-Contact or post-Contact period sites in the areas where ground-disturbing activities would occur. The areas in the APE are not considered to have a high sensitivity for archeological resources. Furthermore, the area has suffered heavy disturbance in the past, reducing the chances of finding intact archeological resources. Therefore, no direct or indirect effects on archeological resources would be expected under the Proposed Action. Construction personnel involved in ground-disturbing and excavation activities would be aware of the appropriate procedures outlined in the Fairchild AFB ICRMP if artifacts or archeological resources are inadvertently discovered (92 CES/CEV 2002a).

Architectural Resources. The Proposed Action includes projects to demolish several buildings within the proposed JPRA historic district, construct new facilities within the proposed Deep Creek historic district, and renovate individually eligible building 2050. These projects will have adverse effects on historic properties. Fairchild AFB will consult with the Washington SHPO to determine if these effects can be avoided, minimized or mitigated.

Maintenance and repair of historic buildings and structures could result in adverse effects. Some maintenance and renovation activities, such as window replacements, could adversely alter the appearance and character of a historic building. Conversely, maintenance and repair of historic facilities can preserve historic and distinctive attributes when done in accordance with the *Secretary of the Interior's Standards for Rehabilitation*. When maintenance, repair, and rehabilitations are carried out properly, historic buildings can be adapted to other functional uses without deteriorating to the point that historical significance is lost. Historic facilities on military installations face the additional challenge of maintaining security requirements.

The Proposed Action could result in minor modifications to historic facilities on Fairchild AFB. However, Fairchild AFB would conduct all modifications in accordance with the *Secretary of the Interior's Standards for Rehabilitation*. The SHPO would be consulted where necessary to review and approve specific building plans so that the historical integrity is not changed. Overall, potential adverse effects would be minor. Beneficial effects would be expected by increasing the utility and function of historic structures and preventing deterioration.

There is no potential for degradation of setting from noise and visual intrusion related to the construction activities proposed in this EA, nor is there potential for structural damage from noise and low-frequency sound vibrations associated with the construction activities.

Traditional Cultural Properties. The potential for discovering sites culturally significant to the Spokane or Coeur d'Alene Tribes is low. No direct or indirect effects on traditional cultural properties would be expected under the Proposed Action. However, in the event of the inadvertent discovery of human remains during ground-breaking activity, the appropriate procedures identified in the Fairchild AFB ICRMP would be followed (92 CES/CEV 2002a).

In the event of an inadvertent discovery during construction, all work in the immediate vicinity of the discovery would be halted until the resources are identified and documented and an appropriate mitigation strategy developed in consultation with the SHPO and other consulting parties. In compliance with NAGPRA, concerned tribal representatives would be notified and consulted about the proposed treatment of human remains and funerary and sacred objects should these be discovered during implementation of the Proposed Action.

4.3.9 Socioeconomics and Environmental Justice

The Proposed Action would not result in any adverse effects on socioeconomics or environmental justice. New construction efforts would result in short-term intermittent increases in employment opportunities.

Socioeconomics. The Proposed Action does not involve any change in the number of personnel at Fairchild AFB. Construction would only temporarily affect employment levels. Therefore, there would be no long-term effects on the local workforce or employment levels in the ROI or MSA.

Construction costs of the Proposed Action would have a direct, beneficial impact on the local economy. It is assumed that construction crews and equipment would be employed from the local workforce, resulting in beneficial short-term direct effects on employment and the local economy.

Indirect effects from the proposed construction projects are expected to be short-term and beneficial on the local economy and employment. Indirect beneficial effects could include construction expenditures for building materials, construction workers wages and taxes, and purchases of goods and services in the area. Construction projects for the Proposed Action are planned over the next 5 years. Therefore, no permanent or long-term effects on population, personal income, or poverty levels; or other demographic or employment indicators in the ROI would be expected.

Environmental Justice. As discussed in **Section 3.9**, the USAF has issued guidance on environmental justice analysis for EAs. To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to regional and state statistics to determine if minority or low-income groups could be disproportionately affected by the Proposed Action. The review indicates that residents living within Tracts 138 and 139 have the highest percentages of African American as compared to populations than the MSA and Washington. Tracts 140.01 and 140.02 have substantially higher percentages of residents living below the poverty level than regional or state averages (see **Table 3-7**).

Potential adverse impacts from new construction activities would occur on Fairchild AFB, with no adverse impacts anticipated off-installation. Construction activities at Fairchild AFB would be dispersed throughout the installation over the next 5 years. The environment around Fairchild AFB is influenced by USAF operations, land management practices, vehicle traffic, and emissions sources outside the installation. Possible adverse effects from construction such as increased traffic, noise, and decreased air quality would be experienced equally by on- or off-installation residents. Therefore, no disproportionate impacts on minority or low-income populations from the Proposed Action were identified.

4.3.10 Infrastructure

The Proposed Action would not result in any long-term minor adverse effects on the installation's infrastructure. Long-term beneficial effects would be realized from improved infrastructure and communication systems. Most routine infrastructure improvements are categorically excluded from detailed analysis under Appendix B to 32 CFR Part 989 (i.e., A2.3.8, A2.3.9, A2.3.10, A2.3.11, A2.3.12, A2.3.13, or A2.3.14), unless a particular project is unusually large or traverses a sensitive area of the installation. Infrastructure projects that would be categorically excluded from analysis in an EA or EIS are not included in this IDEA (see **Appendix A** for a complete list of projects that are analyzed in this IDEA).

Airfield. As discussed in **Section 3.10**, the Fairchild AFB airfield pavement system was determined to be adequate. The excess aircraft runway shoulders would be demolished as a part of the Proposed Action. It is estimated that 30,000 ft^2 of cement and asphalt would be removed and the debris recycled. The

installation would continue maintenance and repairs of the airfield at Fairchild AFB keeping conditions adequate, therefore no adverse effects under the Proposed Action are expected.

The airfield lighting system was determined to be in degraded condition (see **Section 3.10**). However, it does not represent a constraint to future development at Fairchild AFB. In addition, there is no airfield infrastructure on the JPRA. No adverse effects under the Proposed Action are expected on the airfield lighting system.

Communications. Fairchild AFB continually upgrades the communications system on-installation as needed. Services and infrastructure are available to support a wide range of communications requirements and are capable of supporting future development at Fairchild AFB. No adverse effects would be expected on the communications system at Fairchild AFB.

Electrical. Fairchild AFB continually updates the electrical distribution system as needed, including moving aboveground lines below ground when power poles have reached the end of their useful life. As discussed in **Section 3.10**, the electrical distribution and backup power systems were determined to be adequate to meet current and future demands at Fairchild AFB. Fairchild AFB is undergoing a transformation on the installation to be able to monitor their energy consumption on a daily basis and make adjustment to energy usage almost immediately if required. This Extend installation-wide Energy Management Control System (EMCS) update involve upgrading electronics, installation of monitoring panels and some trenching to run cable. No adverse effects on electrical systems would result from the Proposed Action.

Heating and Cooling. Fairchild AFB continually repairs and replaces HVAC systems. The combination of upgraded HVAC systems and scheduled repairs has made the heating and cooling systems at Fairchild AFB adequate. No adverse effects on heating and cooling would result from the Proposed Action.

Liquid Fuel. Fairchild AFB continually repairs and replaces liquid fuel systems, as necessary. The combination of upgraded liquid fuel systems and scheduled repairs has made the system at Fairchild AFB adequate. No adverse effects on the liquid fuel system would result from the Proposed Action.

Natural Gas. As discussed in **Section 3.10**, much of the natural gas system was replaced in the 1990s. Fairchild AFB continually repairs and replaces old steel lines with plastic piping as it is needed. Natural gas service at Fairchild AFB was rated as adequate to meet current and future demands at Fairchild AFB. No adverse effects on natural gas would be expected.

Sanitary Sewer. The sanitary sewer system was determined to be degraded (see **Section 3.10**). Fairchild AFB continually repairs and replaces the sanitary sewer system lines as replacements are needed. No adverse effects on the sanitary sewer system would result from the Proposed Action.

Transportation Network. The C&D phase of the Proposed Action at Fairchild AFB would require delivery of materials to and removal of debris from construction sites. Construction traffic would comprise a small percentage of the total existing traffic and many of the vehicles would be driven to and kept onsite for the duration of construction and demolition, resulting in relatively few additional trips. The proposed installation development activities would occur at different times and locations on Fairchild AFB. Furthermore, potential increases in traffic volume associated with proposed demolition and construction activity would be temporary. Therefore, increased traffic associated with construction vehicles would not be expected to have a significant effect on the transportation network at Fairchild AFB.

Fairchild AFB has a highly rated transportation network that is maintained by proactive repair and replacement projects. Maintenance has been quick to respond to disturbances in the pavement that are the result of heat. No adverse effects on the transportation network are expected under the Proposed Action.

Water. Fairchild AFB continually implements projects to improve the water supply system on the installation. Future improvements involve removing the remaining asbestos cement transit pipes and replacing them with plastic pipes, and providing a loop and back feed to the western portion of the installation to connect the remainder of the system. As discussed in **Section 3.10**, the installation water supply distribution system was rated as better than adequate with improvements such as a new water storage tower, installation of plastic mains, and the addition of the second supply connect point having been made. However, there are two major projects planned for Fairchild AFB: upgrade and improve the water lines of the water distribution system and the fire fighting water supply system at the AETC Survival School and , and upgrade and improve the main waterline from an off installation source (6 miles) to Fairchild AFB. Both of these projects are in areas of highly disturbed land and would not impact any wetlands or threatened and endangered species. These two projects are analyzed in **Sections 4.4.3.1** and **4.4.3.2**. No adverse effects would be expected on water under the Proposed Action.

Solid Waste. Short-term, direct, minor adverse effects would result from increased MSW production during construction. Solid waste generated from the proposed C&D activities would consist of building materials such as solid pieces of concrete, metals (conduit, piping, and wiring), and lumber. Contractors would be required to recycle C&D to the greatest extent possible as part of installation policy, and any recycled C&D waste would be diverted from landfills. Much of the demolition debris would likely be contaminated with nails, rebar, or other building materials that would limit recycling. C&D waste is generally uncontaminated and would be reused or recycled if possible. All of the C&D waste would be sent to an approved local landfill that would be contracted by the private developer. As described in **Section 2.1**, C&D activities would occur over an estimated 5-year timeframe.

4.3.11 Hazardous Materials and Waste

The Proposed Action would not result in any long-term adverse effects on hazardous materials use or hazardous waste generation. Short-term minor adverse effects resulting from use of hazardous materials during construction, such as sealants and solvents, would be minimal.

Hazardous Materials. Products containing hazardous materials would be procured and used during the proposed construction. It is anticipated that the quantity of products containing hazardous materials used during each construction would be minimal and their use would be in short duration. Cumulatively, there would be a large quantity of hazardous materials used. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal, state, and USAF regulations.

The use of hazardous materials would be reported to the 92 CES and Hazardous Materials Pharmacy (HAZMART) office. A list of all hazardous materials should include a copy of each material's Material Safety Data Sheet, an estimate of how much material would be used, amount stored, duration of use, and location on the facility prior to the start of work. The increase in hazardous materials would not affect overall management plans or capacities for handling these materials. Therefore, the Proposed Action would have no effect on hazardous materials management at Fairchild AFB.

Hazardous Waste. It is anticipated that the quantity of hazardous wastes generated from proposed construction activities would be negligible. Contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations, as well as Fairchild AFB's Hazardous Waste Management Plan (HWMP). Contractors would turn in hazardous waste to the

environmental flight for proper disposal. This increase would not be expected to impact the management plans or capacities for handling this waste. Therefore, the Proposed Action would contribute negligibly to the installation's hazardous waste management program and result in no noticeable adverse effects.

Pollution Prevention. Quantities of hazardous materials and chemical purchases, off-installation transport of hazardous wastes, disposal of municipal solid wastes, and energy consumption would continue and increase during construction. Operation of the Proposed Action would require procurement of products containing hazardous materials, generation of hazardous waste, and consumption of energy consistent with the baseline condition associated with the operation of the Proposed Action. The Pollution Prevention Program at Fairchild AFB would accommodate the Proposed Action.

Radon. Fairchild AFB is within an area of moderate potential for radon gas decay (USEPA 2006), which means that indoor activity is on average between 2 and 4 picocuries per liter (pCi/L). Radon gas is typically found in underground or enclosed spaces. It could be necessary to install ventilation and monitor any of the proposed projects that would involve underground or enclosed spaces. Ventilation and monitoring of radon levels would ensure that there would be no long-term adverse effects associated with radon gas.

Asbestos-Containing Materials and Lead-Based Paint. Specifications for proposed construction activities (as discussed in **Section 3.11**) and USAF regulations prohibit the use of ACM and LBP for new construction. Buildings scheduled for demolition could contain ACM and LBP and, therefore, would need to be surveyed by the contractor for ACM and LBP prior to commencing demolition activities. The 92 CES maintains maintenance and abatement records. Sampling for ACM and LBP would occur prior to demolition activities and would be handled in accordance with the Fairchild AFB Asbestos and Lead-Paint Management Plans and USAF policy.

Environmental Restoration Program. There is the potential for construction workers to encounter contamination from ERP sites during construction. Therefore, it is recommended that a health and safety plan be prepared in accordance with OSHA requirements prior to commencement of construction activities. Workers performing soil-removal activities within ERP sites are required to have OSHA 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. In addition to this training, supervisors are required to have an OSHA Site Supervisor certification. Should contamination be encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB programs and procedures. HAZWOPER regulations that protect workers and the public at or near a hazardous waste clean-up site are discussed in 29 CFR 1910.120 and 29 CFR 1926. The Hazardous Sites Cleanup Act 108 of 1988 provides the regulations for the cleanup of hazardous waste sites, response and investigation for liability and cost recovery, and established the Hazardous Sites Cleanup Fund. No long-term adverse effects to hazardous materials and wastes are expected to occur as a result of the Proposed Action.

4.4 Detailed Environmental Consequences of the Proposed Action

4.4.1 Representative Demolition Projects

4.4.1.1 D1. Demolish CE Complex

The CE Complex (Building 2451) is currently used by the CE Squadron and housing administrative, engineering, and supply functions. This complex is old and has reached the end of its useful life. Demolition would provide an estimated 173,443 ft^2 of pervious surface. There are no sensitive environmental or operational constraints in the vicinity of the CE complex (see **Figure 2-2**).

Noise. Short-term minor intermittent adverse effects on noise levels would be expected as a result of the demolition of the CE complex. The noise emanating from the proposed demolition of this complex would be localized, short-term, and intermittent during construction equipment and machinery operations. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire demolition period, which would limit the duration of increased noise levels. The demolition of the complex would be expected to result in noise levels comparable to those indicated in **Table 4-1**. This area of Fairchild AFB is used for industrial activities; typical noise receptors would include USAF personnel working in civil engineer shops, supply facilities, transportation maintenance and operations facilities, and utility operations. Typical noise receptors would be approximately 500 feet from the source of the demolition noise; noise levels would be comparable to that of a very noisy urban residential area (71 dBA) (see **Table 3-1**).

Table 4-1. Expected Noise Levels Resulting from Demolition of the CE Complex

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
D1. Demolish CE Complex	173,443	91	86	71	66	56

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. Long-term beneficial effects would be expected from demolition of the CE complex. Demolition activities would have beneficial effects on the installation's organizational functions by removing old, outdated facilities and creating open space for future development. The construction of new facilities where land has been made available by demolition reduces the amount of undisturbed land required for future development. The demolition of the CE complex which is currently within a community (commercial) land use category, would make land available for the construction of new community facilities. Present and future land uses would be compatible and no changes in land use functions would be expected.

Air Quality. Short-term minor adverse effects would be expected as a result of the demolition of the CE complex. Demolition activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the demolition area. Demolition of these buildings would be expected to result in air emissions comparable to those indicated in **Table 4-2**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the demolition of the CE complex would not exceed 10 percent of the regional emissions values.

Table 4-2. Expected Criteria Pollutant Emissions Resulting from Demolition of the CE Complex

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
D1. Demolish CE Complex	173,443	3.2	0.8	3.7	0.1	0.1
10% of Regional Emissions Inventory		4,928	7,447	34,505	332	13,101

Safety. Short-term minor adverse effects would be expected from the demolition of the CE complex as a result of the risks associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents with increased demolition activities. Construction workers could encounter contamination as a result of ACM or LBP. These hazards are discussed in more detail in the subsection addressing *Hazardous Materials and Wastes*. Demolition activities would be accomplished in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

The demolition of the CE complex has the potential for increased safety risks from its close proximity to ERP sites. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000).

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the vicinity of the CE complex have been heavily disturbed by previous activities. BMPs would be employed during demolition activities to minimize potentially adverse effects on soil and prevent soil erosion and runoff. All demolition activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. The demolition of the CE complex has the potential to result in minor adverse effects as a result of erosion and sedimentation associated with ground-disturbing activities. Fairchild AFB's SWPPP does not cover the demolition or construction projects, therefore a NPDES permit with a site specific SWPPP with BMPs would be required for the demolition of the CE complex to reduce the potential for adverse effects on surface water bodies. Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The demolition of the CE complex would not be expected to result in adverse effects on biological resources. The vicinity of the CE complex is heavily disturbed; there is minimal existing vegetation, no suitable habitat for wildlife, and no wetlands. Furthermore, there are no known Federal- or state-protected species that occur on Fairchild AFB. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The CE complex, although constructed in 1943, has been evaluated as not eligible for listing in the NRHP. The building is also not considered to be a contributing element to any of the three historic districts proposed at Fairchild AFB. Accordingly, demolition of the CE complex would have no effect on cultural resources.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed demolition of the CE complex. The demolition activities would provide temporary employment for contractors in the area. Demolition would occur entirely on Fairchild AFB and has little potential to affect off-installation resources.

Infrastructure. Negligible effects on infrastructure resources would be expected from the demolition of CE complex. Removal of these facilities would result in less demand for certain utilities, but this reduction would be negligible when compared with total installation usage. Short-term adverse effects would be expected as a result of the generation of approximately 13,440 tons of demolition debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during the demolition activities; however, debris that would not be recycled would be landfilled, which would be considered a long-term irreversible adverse effect.

Hazardous Materials and Wastes. Building 2451 should be assumed to contain both ACM and LBP because it was constructed in 1943. Long-term adverse effects on hazardous materials management and hazardous waste generation would be expected as a result of the proposed demolition of the CE complex. Short-term direct adverse effects to demolition personnel could be expected from the potential exposure to ACM and LBP. Sampling for ACM and LBP would occur prior to any demolition activities so that these materials can be properly characterized, handled, and disposed of in accordance with the Fairchild AFB Asbestos Management and Operating Plan (FAFB undated), Lead-Based Paint Management Plan (92 ARW/CC 2003), and USAF policy. The demolition of the CE complex also has the potential for increased safety risks from its close proximity to ERP sites. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000).

4.4.1.2 D2. Demolish Buildings 1, 2, 3, and 8

Buildings 1, 2, 3, and 8 are Visitor/Mission Support Area Buildings located in the southern portion of the JPRA. These buildings are old, have reached the end of their useful life, and do not comply with AT/FP setback criteria. Demolition would provide an estimated 100,000 ft^2 of pervious surface. There are no sensitive environmental or operational constraints in the vicinity of these buildings (see **Figure 2-2**).

Noise. Short-term minor intermittent adverse effects on noise levels would be expected as a result of the demolition of Buildings 1, 2, 3, and 8. The noise emanating from the proposed demolition of these buildings would be localized, short-term, and intermittent during construction equipment and machinery operations. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire demolition period, which would limit the duration of increased noise levels. The demolition of these buildings would be expected to result in noise levels comparable to those indicated in **Table 4-3**.

This area of JPRA is used for administrative functions; typical noise receptors would include USAF personnel involved in offices, communication, and security forces functions. Typical noise receptors would be approximately 125 to 500 feet from the source of the demolition noise; noise levels would be comparable to that of a very noisy urban residential area (70 dBA) (see **Table 3-1**).

Table 4-3. Expected Noise Levels Resulting from Demolition of Buildings 1, 2, 3, and 8

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
D2. Demolish Buildings 1, 2, 3, and 8	100,000	89	74	69	64	54

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. Long-term beneficial effects would be expected from demolition of these buildings. Demolition activities would have beneficial effects on the installation's organizational functions by removing old, outdated facilities and creating open space for future development. The construction of new facilities where land has been made available by demolition reduces the amount of undisturbed land required for future development. It is anticipated that the demolition of these buildings would make space available for the construction of a new entry control point and Main Gate at JPRA. No changes in land use functions would be expected. Present and future land uses would be compatible.

Air Quality. Short-term minor intermittent adverse effects would be expected as a result of the demolition of Buildings 1, 2, 3, and 8. Demolition activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the demolition area. Demolition of these buildings would be expected to result in air emissions comparable to those indicated in **Table 4-4**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the demolition of these buildings would not exceed 10 percent of the regional emissions values.

Table 4-4. Expected Criteria Pollutant Emissions Resulting from the Demolition of Buildings 1, 2, 3, and 8

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
D2. Demolish Buildings 1, 2, 3, and 8	100,000	1.8	0.5	2.0	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects would be expected from the demolition of these buildings as a result of the risks associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents with increased demolition activities. Construction workers could encounter contamination as a result of ACM or LBP. These hazards are discussed in more detail in the subsection addressing *Hazardous Materials and Wastes*. Demolition activities would be accomplished in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the vicinity of Buildings 1, 2, 3, and 8 have been heavily disturbed by previous activities. BMPs would be employed during demolition activities to minimize potentially adverse effects on soil and prevent soil and erosion runoff. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. The demolition of these buildings has the potential to result in minor adverse effects as a result of erosion and sedimentation associated with ground-disturbing activities. Fairchild AFB's SWPPP does not cover the demolition or construction projects, therefore a NPDES permit with a site specific SWPPP with BMPs would be required for the demolition of the Buildings 1, 2, 3, and 8 to reduce the potential for adverse effects on surface water bodies. Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The demolition of Buildings 1, 2, 3, and 8 would not be expected to result in adverse effects on biological resources. The vicinity of these buildings is maintained as mowed vegetation and landscaping. There is minimal suitable habitat for wildlife, and no wetlands. Furthermore, there are no known Federal- or state-protected species that occur on JPRA. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. Buildings 1, 2, 3, and 8 are non-contributing elements within the proposed JPRA historic district. These buildings have all been significantly altered and are considered ineligible for listing in the NRHP either as individual properties or as elements of the historic district. Demolition of these buildings would have minor short-term adverse visual effects on the proposed historic district, but would not constitute an adverse effect to the historic district under the NHPA. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy. Prior to demolition of Buildings 1, 2, 3, and 8, Fairchild AFB will initiate consultation with the Washington SHPO to ensure that any potential impacts to the proposed JPRA historic district are avoided or minimized.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed demolition of Buildings 1, 2, 3, and 8. The demolition activities would provide temporary employment for contractors in the area. Demolition would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Negligible effects on infrastructure resources would be expected from the demolition of these buildings. Removal of these facilities would result in less demand for certain utilities, but this reduction would be negligible when compared with total installation usage. Short-term adverse effects would be expected as a result of the generation of approximately 7,750 tons of demolition debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during the demolition activities; however, debris that would not be recycled would be landfilled, which would be considered a long-term irreversible adverse effect.

Hazardous Materials and Wastes. No long-term effects on hazardous materials management or hazardous waste generation would be expected as a result of the proposed demolition of Buildings 1, 2, 3, and 8. However, because of their ages, it should be assumed that the buildings contain ACM and LBP. Sampling for ACM and LBP would occur prior to any demolition activities so that these materials can be properly characterized, handled, and disposed of in accordance with the Fairchild AFB Asbestos Management and Operating Plan (FAFB undated), Lead-Based Paint Management Plan (92 ARW/CC 2003), and USAF policy. The demolition of these buildings would not affect or be affected by ERP sites.

4.4.1.3 D3. Demolish Clinic

The clinic is old and has reached the end of its useful life. Demolition would provide an estimated 50,000 ft^2 of open space for new buildings, pavement, and infrastructure. Demolition activities would create open space in this industrial area that would be available for future development. There are no sensitive environmental or operational constraints in the vicinity of this building (see **Figure 2-2**).

Noise. Short-term minor intermittent adverse effects on noise levels would be expected as a result of the demolition of the clinic. The noise emanating from the proposed demolition of this building would be localized and intermittent during construction equipment and machinery operations. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source.

Heavy construction equipment would not be operational during the entire demolition period, which would limit the duration of increased noise levels. The demolition of the clinic would be expected to result in noise levels comparable to those indicated in **Table 4-5**. This area of Fairchild AFB is used for administrative activities; typical noise receptors would include other administrative offices and nearby dormitories. Typical noise receptors would be approximately 400 feet from the source of the demolition noise; noise levels would be comparable to that of a very noisy urban residential area (70 dBA) (see **Table 3-1**).

Table 4-5. Expected Noise Levels Resulting from Demolition of the Clinic

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
D3. Demolish Clinic	50,000	89	74	69	64	54

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. Long-term beneficial effects would be expected from demolition of the clinic. Demolition activities would have beneficial effects on the installation's organizational functions by removing old, outdated facilities and creating open space for future development. The demolition of these buildings, which are mostly administrative facilities, is anticipated to make land available for future development; compatible uses for future development would include industrial or administrative activities or open space. Present and future land uses would be compatible.

Air Quality. Short-term minor intermittent adverse effects would be expected as a result of the demolition of the current clinic. Demolition activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the demolition area. Demolition of these buildings would be expected to result in air emissions comparable to those indicated in **Table 4-6**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the demolition of these buildings would not exceed 10 percent of the regional emissions values.

Table 4-6. Expected Criteria Pollutant Emissions Resulting from Demolition of the Clinic

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
D3. Demolish Clinic	50,000	1.0	0.3	1.0	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects would be expected from the demolition as a result of the risks associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents with increased demolition activities. Construction workers could encounter contamination as a result of ACM or LBP. These hazards are discussed in more detail in the subsection addressing *Hazardous Materials and Wastes*. Demolition activities would be accomplished in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the vicinity of the clinic have been heavily disturbed by previous activities. BMPs would be employed during demolition activities to minimize potentially adverse effects on soil and prevent soil and erosion runoff. All demolition activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. The demolition of the clinic has the potential to result in minor adverse effects as a result of erosion and sedimentation associated with ground-disturbing activities. Fairchild AFB's SWPPP does not cover the demolition or construction projects, therefore a NPDES permit with a site specific SWPPP with BMPs would be required for the demolition of the clinic to reduce the potential for adverse effects on surface water bodies. Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The demolition of the clinic would not be expected to result in adverse effects on biological resources. The vicinity of this building is largely disturbed; there is minimal existing vegetation, no suitable habitat for wildlife, and no wetlands. There are no Federal- or state-protected species known to occur in the vicinity of the clinic on Fairchild AFB. Following demolition activities, the demolished areas would be revegetated with native landscape and maintained as mowed areas until future development. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The demolition of the clinic would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in the vicinity of this proposed demolition, and the area is heavily disturbed with low potential to yield intact resources in the future. The clinic has been evaluated and determined not eligible for the NRHP. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy. .

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed demolition of the clinic. The demolition activities would provide temporary employment for contractors in the area. Demolition would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Negligible effects on infrastructure resources would be expected from the demolition of the clinic. Short-term adverse effects would be expected as a result of the generation of approximately 3,875 tons of demolition debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during the demolition activities; however, debris that would not be generated would be landfilled, which would be considered a long-term irreversible adverse effect.

Hazardous Materials and Wastes. No long-term effects on hazardous materials management or hazardous waste generation would be expected as a result of the proposed demolition of the clinic. However, because of its age, it should be assumed to contain both ACM and LBP. Sampling for ACM and LBP would occur prior to any demolition activities so that these materials can be properly

characterized, handled, and disposed of in accordance with the Fairchild AFB Asbestos Management and Operating Plan (FAFB undated), Lead-Based Paint Management Plan (92 ARW/CC 2003), and USAF policy.

4.4.2 Representative Construction Projects

4.4.2.1 C1. Construct CE Complex

The proposed CE complex would replace older, outdated facilities proposed for demolition in **Section 4.4.1.1**. The construction of pavements for the proposed CE complex is analyzed as an infrastructure project in **Section 4.4.1.1**. There are no sensitive environmental or operational constraints in the vicinity of these buildings (see **Figure 2-2**).

Noise. Short-term minor adverse effects would be expected as a result of the construction of the CE complex. The noise emanating from the proposed construction area would be localized, short-term, and intermittent during operation of construction equipment. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire construction period, which would limit the duration of increased noise levels. The proposed construction activities would be expected to result in noise levels comparable to those indicated in **Table 4-7**. This area of Fairchild AFB is used for industrial activities; typical noise receptors would include USAF personnel working in civil engineer shops, supply facilities, transportation maintenance and operations facilities, and utility operations. Typical noise receptors would be approximately 500 feet from the source of the construction noise; noise levels would be comparable to that of a very noisy urban residential area (70 dBA) (see **Table 3-1**).

Table 4-7. Expected Noise Levels Resulting from Construction of CE Complex

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
C1. Construct CE Complex	184,000	91	86	71	66	56

Land Use. No effects on land use would be expected from the construction of the CE complex. The proposed facilities would be constructed in the existing industrial land use category. The location of proposed facilities would be compatible with existing and future land use as identified in the Fairchild AFB General Plan (92 ARW 2005).

Air Quality. Short-term minor adverse effects would be expected as a result of the construction of the proposed CE complex. Construction activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the construction area. Construction of the CE complex would be expected to result in air emissions comparable to those indicated in **Table 4-8**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the construction of the CE Complex would not exceed 10 percent of the regional emissions values.

Table 4-8. Expected Criteria Pollutant Emissions Resulting from Construction of CE Complex

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
C1. Construct CE Complex	184,000	3.3	0.8	3.9	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects on safety would be expected as a result of increased risk associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction activities would be accomplished only in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the vicinity of the proposed construction site have been heavily disturbed by previous activities; currently, the site proposed for construction is impervious pavement and structures. Prior to construction, those impervious surfaces would be removed and prepared for the construction of the CE complex. All construction activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. Short-term minor adverse effects would be expected from grading, excavating, and grooming of the soil and use of hazardous materials during construction. These activities have the potential to result in runoff from the construction site into receiving water bodies. The proposed construction of the CE complex would require an NPDES construction permit, so development of a site-specific SWPPP with specific BMPs to reduce site runoff would be required. All construction activities would comply with the site-specific SWPPP and the installation's Spill Prevention Control and Countermeasures Plan to minimize the potential for adverse effects on surface water bodies.

Long-term minor adverse effects would be expected on water resources. The proposed CE complex would add approximately 184,000 ft^2 of impervious surfaces. The area proposed for construction is largely impervious and heavily disturbed.

Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The construction of the CE complex would not be expected to result in adverse effects on biological resources. The vicinity of the proposed construction is heavily disturbed; there is minimal existing vegetation, no suitable habitat for wildlife, and no wetlands. There are no Federal- or state-protected species that are known to occur in the vicinity of the proposed CE complex on Fairchild AFB. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The construction of the CE complex would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in

the vicinity of this proposed construction, and the area is heavily disturbed with low potential to yield intact resources in the future. There are no historically significant or NRHP-eligible structures in the vicinity of the proposed project. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed construction of the CE complex. The construction activities would provide temporary employment for contractors in the area. Construction would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Overall, negligible effects on infrastructure resources would be expected from the construction of the proposed CE complex. The increased demand for utility services, such as water supply, electricity, natural gas, and sanitary sewer, would be offset by the demolition of the current CE facilities. This change in utility demand would be negligible when compared with total installation usage. Short-term adverse effects would be expected as a result of the generation of approximately 403 tons of construction debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during construction activities; however, debris that is not recycled would be landfilled, which would be considered a long-term irreversible adverse effect. Construction debris is generally composed of clean materials, and most of this waste would be recycled or ground into gravel for reuse.

Hazardous Materials and Wastes. Short-term minor adverse effects would be expected from the use of hazardous materials during the construction process. The proposed CE complex would include the construction of a hazardous storage area. However, it is not anticipated that the proposed CE complex would result in new waste streams. Storage facilities would comply with AFI 91-119, *Process Safety Management of Highly Hazardous Chemicals*; USAF Occupational Safety and Health Standards 91-68, *Chemical Safety*; AFI 90-821, *Hazardous Communication*; and Fairchild AFB Instruction 32-2003, *Fire Prevention*. Potentially adverse effects to hazardous materials and wastes would be mitigated by following institutional management requirements referenced in the installation's Hazardous Materials Management Plan (HMMP) (92 ARW/CC 2003); HWMP; Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

4.4.2.2 C2. Construct Physical Fitness Center/Sports Complex

The proposed location for the construction of the Physical Fitness Center/Sports Complex is shown in **Figure 2-2**.

Noise. Short-term minor adverse effects would be expected as a result of the construction of the Physical Fitness Center/Sports Complex. The noise emanating from the proposed construction area would be localized, short-term, and intermittent during operation of construction equipment. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire construction period, which would limit the duration of increased noise levels. The proposed construction activities would be expected to result in noise levels comparable to those indicated in **Table 4-9**. This area of Fairchild AFB is used for community activities; typical noise receptors would include other community facilities (e.g., commissary, schools, and outdoor recreation areas). Typical noise receptors would be approximately 500 feet from the source of the construction noise; noise levels would be comparable to that of a very noisy urban residential area (70 dBA) (see **Table 3-1**).

Table 4-9. Expected Noise Levels Resulting from Construction of Physical Fitness Center/Sports Complex

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
C2. Construct Physical Fitness Center/Sports Complex	96,000	90	85	70	65	55

Land Use. No effects on land use would be expected from the construction of the Physical Fitness Center/Sports Complex. The proposed facilities would be constructed in the existing community (commercial) land use category. The proposed Consolidated Physical Fitness Center/Sports Complex would be compatible with existing and future land use as identified in the Fairchild AFB General Plan (92 ARW 2005).

Air Quality. Short-term minor adverse effects would be expected as a result of the construction of the proposed Physical Fitness Center/Sports Complex. Construction activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the construction area. Construction of the Consolidated Physical Fitness Center/Sports Complex would be expected to result in air emissions comparable to those indicated in **Table 4-10**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the construction of the Consolidated Physical Fitness Center/Sports Complex would not exceed 10 percent of the regional emissions values.

Table 4-10. Expected Criteria Pollutant Emissions Resulting from Construction of Physical Fitness Center/Sports Complex

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
C2. Construct Physical Fitness Center/Sports Complex	96,000	1.7	0.5	2.0	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects on safety would be expected as a result of increased risk associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction activities would be accomplished only in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the vicinity of the proposed construction site have been heavily disturbed by previous activities. BMPs would be employed during demolition activities to minimize potentially adverse effects on soil and prevent soil and erosion runoff. All construction activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with

native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. Short-term minor adverse effects would be expected from grading, excavating, and grooming of the soil and use of hazardous materials during construction. These activities have the potential to result in runoff from the construction site into receiving water bodies. The proposed construction of the Physical Fitness Center/Sports Complex would require an NPDES construction permit, so development of a site-specific SWPPP with specific BMPs to reduce site runoff would be required. All construction activities would comply with the site-specific SWPPP and the installation's Spill Prevention Control and Countermeasures Plan to minimize the potential for adverse effects on surface water bodies.

Long-term minor adverse effects would be expected on water resources. The proposed Consolidated Physical Fitness Center/Sports Complex would add an additional 96,000 ft^2 of impervious surfaces. This area of the Fairchild AFB is largely impervious.

Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The construction of the Physical Fitness Center/Sports Complex would not be expected to result in adverse effects on biological resources. The vicinity of the proposed construction is heavily disturbed; there is minimal existing vegetation, no suitable habitat for wildlife, and no wetlands. There are no Federal- or state-protected species that are known to occur in the vicinity of the proposed Physical Fitness Center/Sports Complex on Fairchild AFB. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The construction of the Physical Fitness Center/Sports Complex would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in the vicinity of this proposed demolition, and the area is heavily disturbed with low potential to yield intact resources in the future. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed construction of the Physical Fitness Center/Sports Complex. The construction activities would provide temporary employment for contractors in the area. Construction would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Overall, negligible effects on infrastructure resources would be expected from the construction of the proposed Physical Fitness Center/Sports Complex. The increased demand for utility services, such as water supply, electricity, natural gas, and sanitary sewer, would be offset by the demolition of the current Physical Fitness Center facilities. This change in utility demand would be negligible when compared with total installation usage. Short-term adverse effects would be expected as a result of the generation of approximately 210 tons of construction debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during construction activities; however, debris that is not recycled would be landfilled, which would be considered a long-term irreversible adverse effect. Construction debris is generally composed of clean materials, and most of this waste

would be recycled or ground into gravel for reuse. Construction debris is generally composed of clean materials, and most of this waste would be recycled or ground into gravel for reuse.

Hazardous Materials and Wastes. Short-term minor adverse effects would be expected from the use of hazardous materials during the construction process. The proposed Consolidated Physical Fitness Center/Sports Complex would include the construction of a hazardous materials storage shed. However, it is not anticipated that the proposed Consolidated Physical Fitness Center/Sports Complex would result in new waste streams. Storage facilities would comply with AFI 91-119, *Process Safety Management of Highly Hazardous Chemicals*; USAF Occupational Safety and Health Standards 91-68, *Chemical Safety*; AFI 90-821, *Hazardous Communication*; and Fairchild AFB Instruction 32-2003, *Fire Prevention*. Potentially adverse effects to hazardous materials and wastes would be mitigated by following institutional management requirements referenced in the installation's Hazardous Materials Management Plan (HMMP) (92 ARW/CC 2003); HWMP; Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

4.4.2.3 C3. Construct Pipeline Dormitory

This project would include the construction of a dormitory for rotational students. The proposed location for the dormitory is shown in **Figure 2-2**.

Noise. Short-term minor adverse effects would be expected as a result of the Pipeline Dormitory relocation. The noise emanating from the proposed construction area would be localized, short-term, and intermittent during operation of construction equipment. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire construction period, which would limit the duration of increased noise levels. The proposed construction activities would be expected to result in noise levels comparable to those indicated in **Table 4-11**. This area of Fairchild AFB is considered a housing (unaccompanied) land use; typical noise receptors would include other housing facilities and administrative buildings. Typical noise receptors would be approximately 500 feet from the source of the demolition noise; noise levels would be comparable to that of a very noisy urban residential area (71 dBA) (see **Table 3-1**).

Table 4-11. Expected Noise Levels Resulting from Construction of the Pipeline Dormitory

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
C3. Construct Pipeline Dormitory	82,000	89	75	71	66	56

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. No effects on land use would be expected from the Pipeline Dormitory construction. The proposed facilities would be constructed in the existing housing (unaccompanied) land use category. The proposed Pipeline Dormitory would be compatible with existing and future land use as identified in the Fairchild AFB General Plan (92 ARW 2005)

Air Quality. Short-term minor adverse effects would be expected as a result of the construction of the proposed Pipeline Dormitory facility. Construction activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the construction area. Construction of the Pipeline Dormitory would be expected to result in air emissions comparable to those indicated in **Table 4-12**.

Table 4-12. Expected Criteria Pollutant Emissions Resulting from Construction of the Pipeline Dormitory

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
C3. Construct Pipeline Dormitory	82,000	1.5	0.5	1.8	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the construction of the proposed Pipeline Dormitory facility would not exceed 10 percent of the regional emissions values.

Safety. Short-term minor adverse effects on safety would be expected as a result of increased risk associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction activities would be accomplished only in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. BMPs would be employed during demolition activities to minimize potentially adverse effects on soil and prevent soil erosion and runoff. All construction activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. Short-term minor adverse effects would be expected from grading, excavating, and grooming of the soil during construction. These activities have the potential to result in runoff from the construction site into receiving water bodies. The proposed construction of the Pipeline Dormitory facility would require a NPDES construction permit because the total area disturbed is greater than 1 acre for the entire project, so development of a site-specific SWPPP with specific BMPs to reduce site runoff would be required. All construction activities would comply with the site-specific SWPPP and the installation's Spill Prevention Control and Countermeasures Plan to minimize the potential for adverse effects on surface water bodies.

Long-term minor adverse effects would be expected on water resources. The proposed Pipeline Dormitory facility would add an additional 82,000 ft^2 of impervious surfaces. Improvements to the storm water system in this area of the installation would be required.

Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The construction of the Pipeline Dormitory facility would not be expected to result in adverse effects on biological resources. The proposed construction would remove some vegetation, mostly maintained grass. This area is not particularly suited to wildlife, and construction noise would add only marginally to the increased noise environment during construction activities. There are no wetlands in the vicinity of the proposed construction, and there are no known Federal- or state-

listed species in the vicinity of the proposed Pipeline Dormitory. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The construction of the Pipeline Dormitory facilities would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in the vicinity of this proposed construction, and the area is heavily disturbed with low potential to yield intact resources in the future. There are no historically significant or NRHP-eligible structures in the vicinity of the proposed project. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed Pipeline Dormitory construction. The construction activities would provide temporary employment for contractors in the area. Construction would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Overall, negligible effects on infrastructure resources would be expected from the construction of the proposed Pipeline Dormitory. This facility would result in only a minor increase in utility demand which would be negligible compared with total installation usage. Short-term adverse effects would be expected as a result of the generation of approximately 180 tons of construction debris (USEPA 1998). This is a short-term adverse effect in that debris would only be generated during construction activities; however, debris that is not recycled would be landfilled, which would be considered a long-term irreversible adverse effect. Construction debris is generally composed of clean materials, and most of this waste would be recycled or ground into gravel for reuse.

Hazardous Materials and Wastes. Short-term minor adverse effects would be expected from the use of hazardous materials during the construction process. Operations of the new Pipeline Dormitory would not be expected to cause an introduction of new hazardous materials, so no modifications to Fairchild AFB's permits or hazardous materials or wastes management would be expected. Potentially adverse effects to hazardous materials and wastes would be mitigated by following institutional management requirements referenced in the installation's Hazardous Materials Management Plan (HMMP) (92 ARW/CC 2003); HWMP; Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

4.4.3 Representative Infrastructure Projects

4.4.3.1 I1. Upgrade and Replace AETC Survival School Water Infrastructure

The proposed upgrade and replacement of water lines for the AETC Survival School would require removal of old water lines, installation of new water lines, and the installation of a new 300,000-gallon water tank. This project would involve trenching and installation of approximately 15,000 linear feet of new water pipe. It is expected that half of the new water pipe installation would follow the existing pipeline areas, and the other half would involve new trenching of areas for the water pipe. As shown in **Figure 2-4**, part of this project would take place in the community area of the AETC Survival School and the other portion in the area of the AETC Survival School detention and interrogation area.

Noise. Short-term minor intermittent adverse effects on noise levels would be expected as a result of the construction. The noise emanating from these proposed infrastructure projects would be localized and

intermittent during construction equipment and machinery operations. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire demolition period, which would limit the duration of increased noise levels. The installation of the water lines would be expected to result in noise levels comparable to those indicated in **Table 4-13**. These areas of Fairchild AFB are used for aircraft operations and maintenance or industrial activities; typical noise receptors would include USAF personnel involved in flying operations and aircraft maintenance or working in civil engineer shops, supply facilities, transportation maintenance and operations facilities, and utility operations. Typical noise receptors would be approximately 500 feet from the source of the demolition noise; noise levels would be comparable to that of a very noisy urban residential area (70 dBA) (see **Table 3-1**).

Table 4-13. Expected Noise Levels Resulting from Upgrade and Replacement of AETC Survival School Water Infrastructure

Proposed Project	Project Size (linear feet)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
I1. Upgrade and Replace AETC Survival School Water Infrastructure	14,450	83	69	63	57	51

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. No effects on land use would be expected from the proposed pipeline upgrade project. This project follows the existing water pipeline path and there would be no deviation from the path.

Air Quality. Short-term minor intermittent adverse effects would be expected as a result of construction activities. These activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the demolition area. The proposed construction and demolition of pavements would be expected to result in air emissions comparable to those indicated in **Table 4-14**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by this project would not exceed 10 percent of the regional emissions values.

Table 4-14. Expected Criteria Pollutant Emissions Resulting from Upgrade and Replace AETC Survival School Water Infrastructure

Proposed Project	Project Size (linear feet)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
I1. Upgrade and Replace AETC Survival School Water Infrastructure	14,450	1.13	0.37	1.31	0.03	0.04
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects would be expected as a result of the risks associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction and demolition activities would be accomplished in

accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

The upgrade and replacement of AETC Survival School Water infrastructure has the potential for increased safety risks from its close proximity to ERP sites. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000).

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the areas around both the areas for proposed water lineconstruction and have been heavily disturbed by previous activities. BMPs would be employed during all construction and demolition activities to minimize potentially adverse effects on soil and prevent soil and erosion runoff. All activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. Short-term minor adverse effects would be expected from grading, excavating, and grooming of the soil during construction. These activities have the potential to result in runoff from the construction site into receiving water bodies. All construction activities would comply with the site-specific SWPPP and the installation's Spill Prevention Control and Countermeasures Plan to minimize the potential for adverse effects on surface water bodies.

Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The proposed pavements construction would not be expected to result in adverse effects on biological resources. The areas of construction activities in the community area of the AETC Survival School are largely disturbed; there is minimal natural vegetation. There are no known Federal- or state-protected species that occupy the community area of the AETC Survival School. Current use and disturbance preclude the likelihood of their occurrence. Wetlands, vernal pools, and habitat supporting Spalding's catchfly exist adjacent to the detention and interrogation area of the AETC Survival School. There are no known nest sites or habitats within this area supporting the animal species of concern. Deer and coyote frequent both areas. The noise from construction activities would startle some wildlife and could potentially cause displacement to other areas of the installation. However, the actual construction activities would not affect any wildlife nesting areas. The noise from the construction activities would startle some wildlife, however, this area is frequently used for AETC Survival School operations and does not add any undue disturbance for wildlife in the area. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The proposed water line construction would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in the vicinity of this proposed project, and the area is heavily disturbed with low potential to yield intact resources in the future. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed pavements construction and demolition. These activities would provide temporary employment for contractors in the area. Construction and demolition would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Beneficial effects on infrastructure resources would be expected from the proposed water line upgrades. The new water system would provide the AETC Survival School with adequate water supply for human consumption and fire fighting.

Hazardous Materials and Wastes. Short-term minor adverse effects would be expected from the use of hazardous materials during the pipeline installation process. No long-term effects would be expected. Potentially adverse effects to hazardous materials and wastes would be mitigated by following institutional management requirements referenced in the installation's Hazardous Materials Management Plan (HMMP) (92 ARW/CC 2003); HWMP; Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

The upgrade and replacement of AETC Survival School Water infrastructure has the potential to encounter hazardous materials and wastes, due to its close proximity to ERP sites. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000).

4.4.3.2 I2. Upgrade Water System Between the Wells and Main Base

Fairchild AFB receives some of its water from an off-base well. This well is approximately 6.5 mile from Fairchild AFB and requires replacement due to many years of pipe degradation. Fairchild AFB has an easement right-of-way that provides for access to maintain and repair the existing water pipeline. The water pipe is made of steel and is 2 feet in diameter and runs for approximately 64,000 linear feet. This project replacement is scheduled for 2009. A map of this water line route is seen in **Figure 4-1** (labeled For Official Use Only and not to be released to the public).

The route of this water line crosses park areas, wooded areas, two-lane streets, and a major four-lane highway. The water line does not pass through or near any residential areas or private residences. The pipeline replacement would involve a backhoe and manual labor. It is assumed that the pipe replacement would take 90 to 100 days. Along the 6.5-mile water line, there would be valves, gates and low-off points appropriately installed.

Noise. Short-term minor adverse effects would be expected as a result of the backhoe use and construction trucks along the 6.5-mile water line. The noise emanating from the proposed construction area would be localized, short-term, and intermittent during operation of construction equipment. The nearest human receptors would be 300 to 500 feet from the pipeline. As shown in **Table 4-15**, the anticipated noise levels as a result of construction would be very minor. No long-term effects would be expected.

Land Use. No effects on land use would be expected from the proposed pipeline upgrade project. This project follows the existing water pipeline path and there would be no deviation from the path.

For Official Use Only

Figure 4-1. Water Well Route From Fort Wright to Fairchild AFB, WA (For Official Use Only)

Table 4-15. Expected Noise Levels Resulting from Upgrade of Water System Between the Wells and Main Base

Proposed Project	Project Size (linear feet)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
I2. Upgrade Water System Between the Wells and Main Base	63,000	83	69	63	57	51

Air Quality. Short-term minor adverse effects would be expected as a result of construction equipment operating during the pipe upgrade. Construction activities would result in air emissions from the operation of heavy machinery. As shown in **Table 4-16**, the anticipated air emissions as a result of construction would be very minor. No long-term effects would be expected. Fairchild AFB and Spokane County are in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by the construction of deicing collection points would not exceed 10 percent of the regional emissions values.

Table 4-16. Expected Criteria Pollutant Emissions Resulting from Upgrade of Water System Between the Wells and Main Base

Proposed Project	Project Size (linear feet)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
I2. Upgrade Water System Between the Wells and Main Base	63,000	1.46	0.58	1.69	0.04	0.05
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects on safety would be expected as a result of increased risk associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction activities would be accomplished only in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. No adverse effects on geological resources would be expected during the pipeline replacement project. Construction activities would involve uncovering the existing pipe, removing the old pipe, installing new pipe, and covering the pipe After the new pipe is installed and covered, the path would be restored to its original configuration by replacing sod or replanting native vegetation. The construction area would be small and, with the implementation of BMPs to prevent soil and erosion runoff, adverse effects would be negligible. All construction activities would comply with the state rules and regulation for minimizing erosion by employing erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays, as necessary. There would be no effect of change to impervious surfaces.

Water Resources. No effects on water resources would be expected during the pipeline replacement project. The construction area would be small, and with the implementation of BMPs to prevent soil and erosion runoff, adverse effects would be negligible. All construction activities would comply with the state rules and regulations for minimizing erosion by employing erosion-control techniques such as silt-

fencing, sediment traps, and application of water sprays, as necessary. There would be no effect or change to impervious surfaces.

Biological Resources. No effects on biological resources should be expected during the pipeline replacement project. There are no known Federal- or state-protected species that nest along the pipeline. Fairchild AFB would conduct surveys in areas where potential habitat exists within or adjacent to the water pipeline alignment to assure no adverse effects on species of concern.

Cultural Resources. No effects on cultural resources would be expected during the pipeline replacement project. Presence of cultural resources along the path of the water line is unknown. Fairchild AFB would conduct surveys along the alignment and cease work if unanticipated cultural resources were unearthed. If an unanticipated discovery is found, further surveys would be conducted to assure no adverse effects on cultural resources would occur.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed project. The construction activities would provide temporary employment for contractors in the area. Construction would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Long-term beneficial effects would be expected as a result of the proposed new pipeline replacement. Replacement of the old pipe would ensure no leaks along the pipe path.

Hazardous Materials and Wastes. Short-term minor adverse effects would be expected from the use of hazardous materials during the construction process. The proposed pipeline replacement would involve sealant and pipe joint compounds. All materials used would be used in accordance with OSHA standards and guidelines. Excess hazardous materials and all removed pipe would be recycled.

4.4.3.3 I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads

Fairchild AFB plans to upgrade the FAMCAMP area and make 32 concrete pads available for recreational vehicles (RVs) to park and connect to available utilities. This project would involve placing 32 concrete pads (each 32 ft by 75 ft) for RV parking. As shown in **Figure 2-2**, construction of the RV concrete pads are proposed in the existing FAMCAMP area.

Noise. Short-term minor intermittent adverse effects on noise levels would be expected as a result of the construction of the concrete pads. The noise emanating from these proposed infrastructure projects would be localized and intermittent during construction equipment and machinery operations. **Table 3-1** shows the predicted noise levels for various pieces of construction equipment operating at 50 feet from the source. Heavy construction equipment would not be operational during the entire demolition period, which would limit the duration of increased noise levels. The construction of these concrete pads would be expected to result in noise levels comparable to those indicated in **Table 4-17**. This area is presently used for military members and their families traveling on vacation and visiting Fairchild AFB for short periods of time during the year. Typical noise receptors would be approximately 100 feet from the source of the construction noise; noise levels would be comparable to that of a very noisy urban residential area (79 dBA) (see **Table 3-1**).

Table 4-17. Expected Noise Levels Resulting from Upgrade of FAMCAMP Concrete Pads

Proposed Project	Project Size (ft^2)	dBA at 50 feet	dBA at 300 feet	dBA at 500 feet	dBA at 1,000 feet	dBA at 3,000 feet
I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads	28,000	87	72	67	63	54

Note: The noise level metric is logarithmic, so noise levels cannot be added together.

Land Use. No adverse effects on land use would be expected from construction of the 32 concrete pads at the FAMCAMP area. The proposed pavement, parking, and sidewalks would be compatible with existing and future land uses.

Air Quality. Short-term minor intermittent adverse effects would be expected as a result of pavement construction activities. These activities would result in air emissions from the operation of heavy machinery. Fugitive particulate matter would be minimized by continually spraying water over the demolition area. The proposed construction and demolition of pavements would be expected to result in air emissions comparable to those indicated in **Table 4-18**.

Fairchild AFB is in attainment for all criteria pollutants, so the General Conformity Rule does not apply. In addition, the criteria pollutants generated by this project would not exceed 10 percent of the regional emissions values.

Table 4-18. Expected Air Emissions Resulting from the Upgrade of FAMCAMP Concrete Pads

Proposed Project	Project Size (ft^2)	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads	28,000	1.9	0.6	2.2	0.1	0.1
10% of Regional Emissions Inventory		*4,928*	*7,447*	*34,505*	*332*	*13,101*

Safety. Short-term minor adverse effects would be expected as a result of the risks associated with construction-type activities. No long-term effects would be expected. Although all contractors are required to follow and implement OSHA standards to establish and maintain safety procedures, there would be an increased risk of accidents. Construction and demolition activities would be accomplished in accordance with Federal, state, and local regulations to minimize hazards associated with hazardous materials, wastes, and substances.

Geological Resources. Short-term adverse effects would be expected from grading, excavating, and grooming of the soil. Soils in the areas around both the areas for proposed pavements construction have been heavily disturbed by previous activities. BMPs would be employed during all construction and demolition activities to minimize potentially adverse effects on soil and prevent soil and erosion runoff. All activities would comply with the installation's SWPPP (92 CES/CEV 2000) and employ erosion-control techniques such as silt-fencing, sediment traps, and application of water sprays. Disturbed areas would be revegetated with native vegetation, as necessary. Grading, excavation, and recontouring of soil materials would adhere to Federal, state, and local regulations.

Water Resources. Short-term minor adverse effects would be expected from grading, excavating, and grooming of the soil and use of hazardous materials during construction. These activities have the potential to result in runoff from the construction site into receiving water bodies. The proposed construction of the pavements would not require an NPDES construction permit as the project would comply with the existing construction Fairchild AFB SWPPP. BMPs would be followed to reduce site runoff. All construction activities would comply with the site-specific SWPPP and the installation's Spill Prevention Control and Countermeasures Plan to minimize the potential for adverse effects on surface water bodies.

Long-term minor adverse effects would be expected on water resources. The proposed construction of the concrete pads for the FAMCAMP would add an additional 120,000 ft^2 of impervious pavements over the existing mobility/supply facilities. This area of the Fairchild AFB has been previously used for the parking of RVs on soil and grass. The existing area is impervious and heavily disturbed.

Potentially adverse effects to water resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Biological Resources. The proposed pavement construction and demolition would not be expected to result in adverse effects on biological resources. The area of proposed pavement construction activities is largely disturbed and there is minimal natural vegetation. Furthermore, there is no known Federal- or state-protected species' habitat in the vicinity of the FAMCAMP. Potentially adverse effects to biological resources would be mitigated by following institutional management requirements referenced in the installation's INRMP (FAFB 2005b); SWPPP (92 CES/CEV 2000); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Cultural Resources. The proposed pavement construction and demolition would not be expected to result in adverse effects on cultural resources. There are no known archeological sites or traditional cultural properties in the vicinity of this proposed project, and the area is heavily disturbed with low potential to yield intact resources in the future. Potentially adverse effects to cultural resources would be mitigated by following institutional management requirements referenced in the installation's ICRMP (92 CES/CEV 2002); Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

Socioeconomics and Environmental Justice. Negligible effects on socioeconomic resources would be expected from the proposed pavement construction and demolition. These activities would provide temporary employment for contractors in the area. Construction and demolition would occur entirely on Fairchild AFB and have little potential to affect off-installation resources.

Infrastructure. Negligible effects on infrastructure resources would be expected from the proposed pavement construction and demolition. The existing FAMCAMP area has the required infrastructure to support the numbers of campers for the near future. There is a short-term adverse effect in that debris would only be generated during construction activities.

Hazardous Materials and Wastes. No adverse effects would be expected during the pavement construction process. No long-term effects would be expected. Small amounts of sealants would be used for the installation of utility hook-ups for the RVs, however, this quantity is minimal. Potentially adverse effects to hazardous materials and wastes would be mitigated by following institutional management requirements referenced in the installation's Hazardous Materials Management Plan (HMMP) (92 ARW/CC 2003); HWMP; Fairchild AFB Construction Standards, and all applicable Federal, state, and local regulations and policy.

4.4.4 Analysis of All Proposed Projects

Tables 4-19 through **4-21** summarize the potential environmental consequences associated with the installation development activities that are identified in **Appendix A** but not analyzed as representative projects in **Sections 4.4.1**, **4.4.2**, and **4.4.3**. The proposed locations for these projects are identified in **Figures 4-2** through **4-4**. The intent of these tables is to focus on those potential environmental consequences that would be expected as a result of location- or operation-specific activities. All demolition and construction activities generally would be expected to result in increased noise, increased air emissions, potential for erosion and transport of sediment into surface water bodies, generation of small amounts of hazardous materials and wastes, and generation of solid waste. All demolition and construction activities generally would be expected to result in minor beneficial effects on socioeconomics as a result of job creation and materials procurement. Furthermore, it should be assumed that demolition or renovation activities in older buildings have the potential to disturb ACM or LBP and the appropriate identification, handling, removal, and disposal of those materials would occur in accordance with existing Fairchild AFB management plans and Federal, state, DOD, and USAF regulations and guidance. These types of short-term construction-related effects are identified in **Section 4.3** in the general analysis and **Sections 4.4.1**, **4.4.2**, and **4.4.3** in the detailed analyses of the representative projects. Therefore, they are not discussed for each project in this section; it is assumed that, in the absence of unique constraints, the potential environmental effects associated with the size of a demolition or construction project would be similar to but less than those described in **Sections 4.4.1**, **4.4.2**, and **4.4.3**. Other than those kinds of general construction-related environmental effects described in **Sections 4.3**, **4.4.1**, **4.4.2**, and **4.4.3**, no other potential environmental effects on noise, land use, socioeconomics, or infrastructure were identified so these resources are not included in **Tables 4-19** through **4-21**.

All construction and demolition activities would adhere to Fairchild AFB's existing plans and policies that have been identified and referenced throughout **Sections 2**, **3**, **4**, and **7** of this IDEA. **Tables 4-19** through **4-21** are not meant to substitute for or initiate coordination that might be required as a result of the activities that are identified; they are meant to identify potential effects on sensitive resources. The following summarizes the potential adverse effects for the projects identified in **Appendix A** and the existing management plans and policies regarding those affected resources.

Effects on Air Quality. No projects were identified that would result in modifications to existing air permits or increase in long-term air emissions. No project would violate the NAAQS or any other air quality rule or regulation. **Table 4-22** is meant to be an example; in reality these representative projects would not be expected to occur at the same time, and they would occur over multiple years. As shown in **Table 4-22**, if all these projects were to be implemented simultaneously, the proposed emissions would be well below 10 percent of the regional emissions threshold; therefore, USEPA air quality standards and regulations would not be violated.

Effects on Safety. The potential for adverse effects on human health and safety as identified in **Tables 4-19** through **4-21** pertain to construction and demolition activities within ERP sites. When there is the potential for construction workers to encounter contamination, a health and safety officer must be present during groundbreaking activities. If contamination is encountered, it would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000). Projects with the potential to increase safety risks as a result of ERP sites include the demolition of the CE complex (D1), the demolition of buildings 1324, 1334, 1342, and 1350 (D7), the addition to the Survival Fitness Center (C23), and the upgrade and replacement of the AETC Survival School water infrastructure (I1).

Table 4-19. Potential Constraints to Development Associated with the Proposed Facilities Demolition Projects Listed in Appendix A

Project Title	Air Quality	Safety	Geological Resources	Water Resources	Biological Resources	Wetlands	Cultural Resources	Hazardous Materials and Wastes	Figure
D4. Demolish Columbia Center (Building 2285)	-	-	-	-	-	-	-	-	4-1
D5. Demolish Excess Runway AC Shoulders	-	-	-	-	-	-	-	-	4-1
D6. Demolish PMEL (Building 2135)	-	-	-	-	-	-	-	-	4-1
D7. Demolish Buildings 1324, 1334, 1342, and 1350	-	-	-	-	-	-	⊗	-	4-2
D8. Demolish Shopette (Building 2383)	-	-	-	-	-	-	-	-	4-1

Impacts Legend:

- No effects or negligible effects ⊕ Potential minor beneficial effects ⊗ Potential minor adverse effects ■ Potentially significant (greater magnitude than representative projects)

Table 4-20. Potential Constraints to Development Associated with the Proposed Facilities Construction Projects Listed in Appendix A

Project Title	Air Quality	Safety	Geological Resources	Water Resources	Biological Resources	Wetlands	Cultural Resources	Hazardous Materials and Wastes	Figure
C4. Construct Mission Support Complex	-	-	⊗	⊗	-	-	-	-	4-2
C5. Construct Water Survival Training Facility	-	-	⊗	⊗	-	-	-	-	4-2
C6. Construct School Age Facility	-	-	⊗	⊗	-	-	-	-	4-1
C7. Construct Columbia Center	-	-	⊗	⊗	-	-	-	-	4-1
C8. Construct Logistics Support Complex (WANG)	-	-	⊗	⊗	-	-	-	-	4-2
C9. Construct Visiting Quarters (After Demolition of Buildings 2392 and 2393)	-	-	⊗	⊗	-	-	-	-	4-1
C10. Construct Consolidated Skills Center	-	-	⊗	⊗	-	-	-	-	4-2
C11. Construct Isolated Personnel Training Compound	-	-	⊗	⊗	-	-	-	-	4-3
C12. Construct C-2 Facility West	-	-	⊗	⊗	-	-	-	-	4-3
C13. Construct Peacetime/Government Hostage Detention Lab	-	-	⊗	⊗	-	-	-	-	4-2
C14. Construct Recreation Center (After Demolition of Building 2185)	-	-	⊗	⊗	-	-	-	-	4-1
C15. Construct Personnel Recovery Training Facility Phase II: Instructor Resource Annex	-	-	⊗	⊗	-	-	-	-	4-3
C16. Add to/Alter Fairchild Special Operations Center Building 15	-	-	-	-	-	-	-	-	4-3

Impacts Legend:

- \- No effects or negligible effects
- ⊕ Potential minor beneficial effects
- ⊗ Potential minor adverse effects
- ■ Potentially significant (greater magnitude than representative projects)

Table 4-20. Potential Constraints to Development Associated with the Proposed Facilities Construction Projects Listed in Appendix A (continued)

Project Title	Air Quality	Safety	Geological Resources	Water Resources	Biological Resources	Wetlands	Cultural Resources	Hazardous Materials and Wastes	Figure
C17. Construct Academic Exhibit Facility	-	-	⊗	⊗	-	-	-	-	4-2
C18. Construct Field Operations and Training Storage Building	-	-	⊗	⊗	-	-	-	-	4-3
C19 Construct Physiological Training (PTU) Facility (After Demolition of Building 2001)	-	-	⊗	⊗	-	-	-	-	4-1
C20. Construct Shoppette/Gas Service Station	-	-	⊗	⊗	-	-	-	-	4-1
C21. Construct Force Development Sem. Center, ALS/FTAC Building 716	-	-	⊗	⊗	-	-	-	-	4-1
C22. Add to Survival Dining Facility	-	-	-	-	-	-	-	-	4-2
C23. Add to Survival Fitness Center	-	-	-	-	-	-	⊗	⊗	4-2
C24. Construct AGE Test Pad, Building 2050	-	-	-	-	-	-	⊗	⊗	4-1
C25. Add to Car Wash	-	-	-	⊗	-	-	-	⊗	4-1
C26. Add to/Alter Parachute Training Building 1254	-	-	-	-	-	-	-	-	4-2
C27. Add to/Alter Pest Management Facility, Building 2415	-	-	-	-	-	-	-	⊗	4-1
C28. Add to/Alter Logistics Complex, Building 2050	-	-	-	-	-	-	⊗	-	4-1

Impacts Legend:

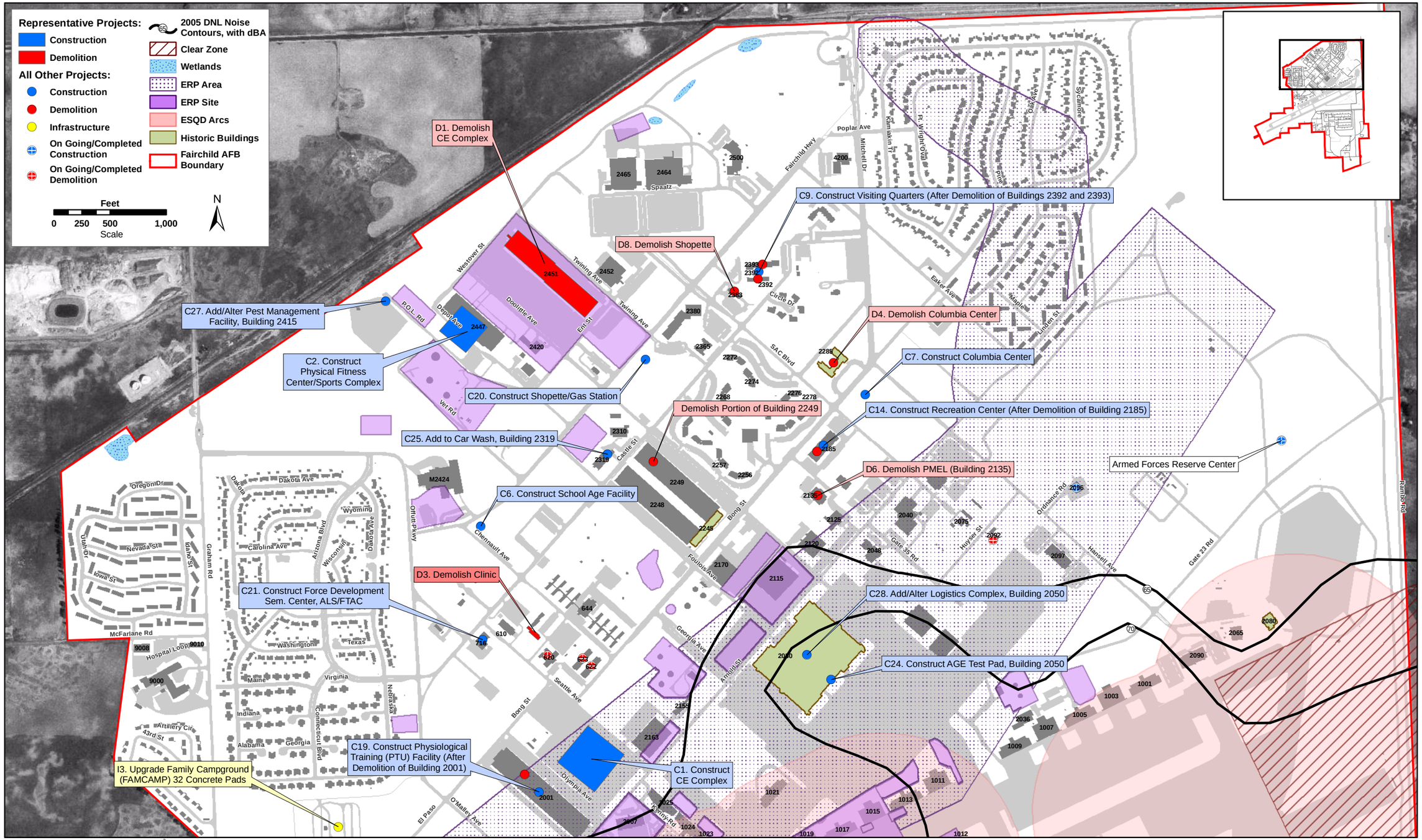
- No effects or negligible effects ⊕ Potential minor beneficial effects ⊗ Potential minor adverse effects ■ Potentially significant (greater magnitude than representative projects)

Table 4-21. Potential Constraints to Development Associated with the Proposed Infrastructure Projects Listed in Appendix A

Project Title	Air Quality	Safety	Geological Resources	Water Resources	Biological Resources	Wetlands	Cultural Resources	Hazardous Materials and Wastes	Figure
I4. Extend installation wide EMCS	-	-	-	-	-	-	-	-	N/A

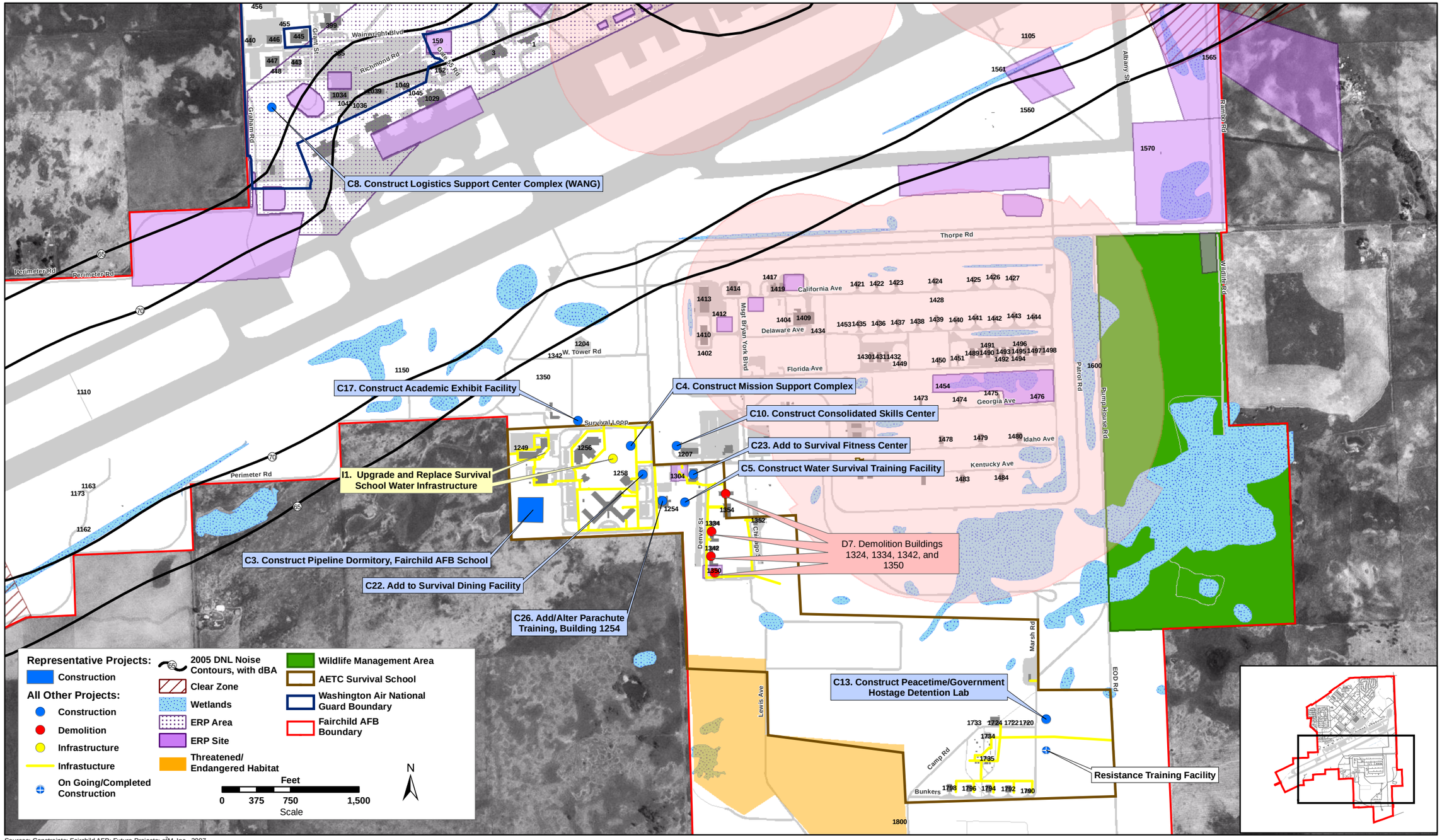
Impacts Legend:

- No effects or negligible effects ⊕ Potential minor beneficial effects ⊗ Potential minor adverse effects ■ Potentially significant (greater magnitude than representative projects)



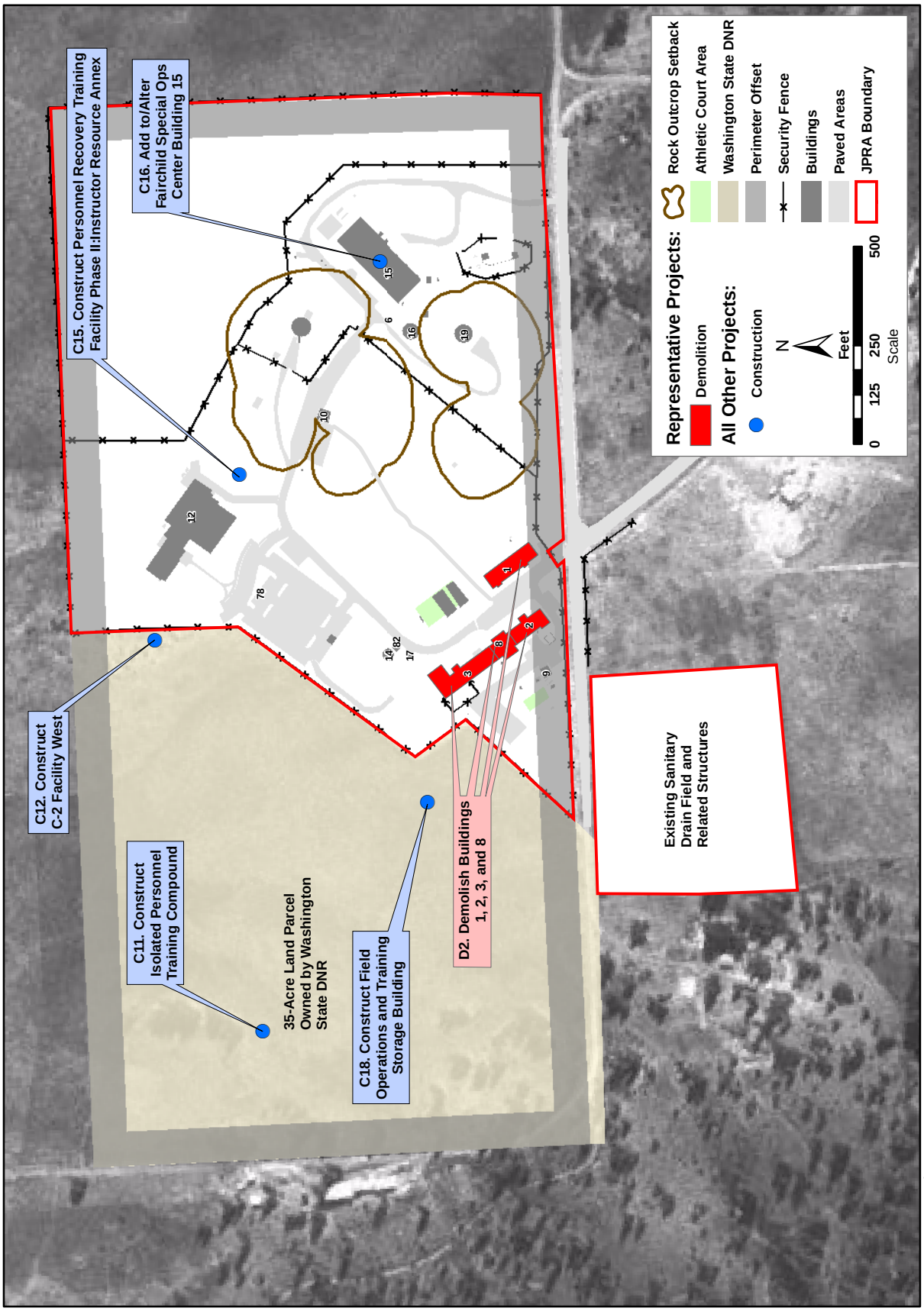
Sources: Constraints: Fairchild AFB; Future Projects: e²M, Inc. 2007
Noise Contours: e²M, Inc., 2007

Figure 4-2. Proposed Projects Relative to Known Land Use Constraints on the Northern Portion of Fairchild AFB



Sources: Constraints: Fairchild AFB; Future Projects: e²M, Inc. 2007
Noise Contours: e²M, Inc., 2007

Figure 4-3. Proposed Projects Relative to Land Use Constraints on the Southern Portion of Faichild AFB



Source of Future Projects: e^{3}M, Inc. 2007

Figure 4-4. Proposed Projects Relative to Known Land Use Constraints at JPRA

Table 4-22. Tons of Criteria Pollutants Produced by Representative Projects

Proposed Project	Project Size	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_x (tpy)	PM (tpy)
D1. Demolish CE Complex	173,443 ft^2	3.2	0.8	3.7	0.1	0.1
D2. Demolish Buildings 1, 2, 3, and 8	100,000 ft^2	1.8	0.5	2.0	0.1	0.1
D3. Demolish Clinic	50,000 ft^2	1.0	0.3	1.0	0.1	0.1
C1. Construct CE Complex	184,000 ft^2	3.3	0.8	3.9	0.1	0.1
C2. Construct Physical Fitness Center/ Sports Complex	96,000 ft^2	1.7	0.5	2.0	0.1	0.1
C3. Construct Pipeline Dormitory	82,000 ft^2	1.5	0.5	1.8	0.1	0.1
I1. Upgrade and Replace AETC Survival School Water Infrastructure	14,450 linear feet	1.13	0.37	1.31	0.03	0.04
I2. Upgrade Water System Between the Wells and Main Base	63,000 linear feet	1.46	0.58	1.69	0.04	0.05
I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads	120,000 linear feet	1.9	0.6	2.2	0.1	0.1
Total Emissions for Representative Projects		**16.99**	**4.95**	**19.6**	**0.77**	**0.79**
10% of Regional Emissions Inventory		1,662	2,557	15,573	170	919

There are no proposed projects located within the ESQD arcs, therefore no effects on safety would be expected under the Proposed Action. If UXO is encountered, the Fairchild Explosive Ordnance Disposal team would be contacted.

Effects on Geological Resources. The projects identified in **Tables 4-19** through **4-21** as having potentially adverse effects on geological resources include those projects that would require an NPDES permit for construction. Due to the size of the proposed construction areas of these specific projects, there is a greater potential for adverse effects as a result of soil erosion and runoff. BMP requirements of the NPDES permit would minimize the potential for adverse effects associated with erosion and sedimentation.

Effects on Water Resources. The projects identified in **Tables 4-19** through **4-21** as having potentially adverse effects on water resources include those projects that would require an NPDES permit for construction. Due to the size of the proposed construction areas of these specific projects, there is a greater potential for adverse effects as a result of soil erosion and runoff. The NPDES permit would require preparation of a site-specific SWPPP to minimize the potential for adverse effects associated with contaminant-laden storm water runoff into receiving water bodies. No projects identified under the Proposed Action would occur within the 100-year floodplain identified at the Well Annex No. 1 or at Clear Lake Recreation area. No 100-year floodplain exists on the main installation at Fairchild AFB.

Effects on Biological Resources. No projects were identified that would adversely affect vegetation or wildlife. Minimal vegetation removal would be expected, but this would affect primarily mowed and maintained grasses. Although there is a diversity of wildlife habitat on Fairchild AFB, the locations of

proposed projects are in previously developed areas where available suitable habitat would be marginal. Wildlife affected by proposed demolition and construction projects would be expected to, for the most part, move to adjacent available habitat during project implementation. Wildlife habitat is poor at Fairchild AFB. As identified in S**ection 3.7.2**, there are vegetation species known to occur on Fairchild AFB that are Federal- and state-listed as threatened. None of the habitat associated with Spalding's catchfly and water howellia are within the vicinity of the projects under the Proposed Action. In the event that any species are identified during the life of this IDEA, then those resources would be avoided and managed in accordance with the INRMP and Federal, state, and local regulations and policies, and the appropriate regulatory agencies would be consulted.

Effects on Wetlands. No projects would occur within the vicinity of wetlands. If a project location were moved so that a wetland would be affected, separate NEPA documentation will be prepared.

Effects on Cultural Resources. Construction of the AGE Test Pad in Building 2050 (C24); and the addition/alteration to the Logistics Complex (C28) in Building 2050; have the potential to result in direct adverse effects on historical resources. Building 2050 has been determined to be eligible for listing in the NRHP. Construction within or adjacent to this building would require coordination with the SHPO to ensure that the historical integrity and feel of the building are not affected. Coordination would ensure that adverse effects on historic properties are avoided, minimized, or mitigated. The only other projects indicated in **Tables 4-19** through **4-21** as having potentially adverse effects on cultural resources are projects D7 and C23. Project D7, which includes the demolition of buildings 1324, 1334, 1342, and 1350, would have an adverse effect on the proposed Deep Creek historic district. Project C23, which includes the construction of an addition to the AETC Survival School Fitness Center, could also have an adverse effect on the Deep Creek historic district. Fairchild AFB will consult with the SHPO regarding ways of avoiding, minimizing, or mitigating the effects of these projects on historic properties.

As identified in S**ection 3**, there are no known NRHP-eligible archeological resources or traditional cultural properties on Fairchild AFB, and the likelihood for discovery is low. In the event that any sites are identified during the life of this IDEA, then those resources would be avoided and managed in accordance with the ICRMP and Federal, state, and local regulations and policies, and the appropriate regulatory agencies would be consulted.

Effects on Infrastructure. The proposed IDEA projects would be expected to result in long-term beneficial effects on infrastructure systems by providing the required road and utilities upgrades to support existing and future missions. However, demolition, construction, and infrastructure projects would result in adverse effects as a result of increased solid waste generation. As indicated in **Table 4-23**, approximately 34,839 tons would be generated over the next 5 years. Clean demolition and construction debris (e.g., concrete, asphalt) would be ground, recycled, and used for fill and road work rather than disposed of in a landfill.

Effects on Hazardous Materials and Wastes. Four projects, the demolition of the CE complex (D1), the demolition of buildings 1324, 1334, 1342, and 1350 (D7), the addition to the Survival Fitness Center (C23), and the upgrade and replacement of the AETC Survival School water infrastructure (I1), could encounter contamination from the close proximity to ERP sites. As indicated under *Safety*, any contamination that is encountered during groundbreaking activities would be handled, stored, transported, and disposed of in accordance with applicable Federal, state, and local regulations; AFIs; and Fairchild AFB's Pollution Prevention Management Action Plan (FAFB 2000). No long-term adverse effects to hazardous materials and wastes are expected to occur as a result of the Proposed Action.

Table 4-23. Anticipated Generation of Construction and Demolition Debris as a Result of All IDEA Projects

Proposed Project	Project Size (ft^2)	Multiplier (pounds/ft^2)	Total Waste Generated	
			pounds	tons
Proposed IDEA Demolition [a]	422,769	155	65,529,195	32,765
Proposed IDEA Construction [a]	877,500	4.38	3,771,180	1,886
Proposed IDEA Renovation [a]	14,500	24.05	348,725	174
Proposed IDEA Pavement Demolition [b]	100,000	6,500,000	0[c]	0[c]
Proposed IDEA Pavement Construction [d]	28,000	1	28,000	14
		Total	**69,677,100**	**34,839**

Sources: [a] USEPA 1998, [b] calculated using standard asphalt density, [c] 100% recycled and reused, [d] USACE 1976

5. Cumulative Effects

CEQ implementing guidelines for NEPA require that the direct, indirect, and cumulative effects of an action be evaluated and published. Cumulative effects are the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. In other words, an EA must determine if insignificant direct effects caused by implementation of the Proposed Action or any of the alternatives would become significant if considered in concert with other actions occurring within the area of interest, defined both geographically and temporally. Actions overlapping with or in close proximity to the Proposed Action would be expected to have greater potential for an incremental impact than those more geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, the analysis needs to address two fundamental questions:

1. Does a relationship exist such that affected resource areas of the Proposed Action or alternatives might interact with the affected resource areas of past, present, or reasonably foreseeable actions?

2. If such a relationship exists, then does an EA reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both timeframe and geographic extent in which effects could be expected to occur, as well as a description of what resources could potentially be cumulatively affected. For the purposes of this analysis, the temporal span of the Proposed Action is 5 years. For most resources, the spatial area for consideration of cumulative effects is Fairchild AFB, with the exception of effects on air quality, which considers Spokane County as the ROI, and socioeconomics, which has an ROI defined as the census tract containing Fairchild AFB and the adjacent census tracts. Similarly, impacts on resources and conditions of activities attributable to other actions within the ROI would not augment the direct and indirect effects of the installation development at Fairchild AFB to the extent that they would significantly increase their effect.

The actions identified for cumulative effects analysis include those pertaining to BRAC 2005 recommendations and those that have ongoing or recently completed EIAP NEPA documents. BRAC recommendations include a loss of 26 military and 172 civilian authorizations, or a total loss of 198 people. The recommendations also include a total loss of 8 KC-135R aircraft from the 92 ARW to Sioux Gateway AGS, Iowa, and the relocation of the 256th Combat Communications Squadron and 242d Combat Communications Squadron to WANG available facilities at Fairchild AFB. The ongoing/recently completed NEPA projects are shown in **Table 5-1**.

The following summarizes potential cumulative effects on specific resources as a result of implementing the proposed IDEA projects, the BRAC 2005 recommendations, and ongoing or recently completed EIAP NEPA projects for personnel and aircraft.

Noise and Land Use. There would be a net loss of 8 aircraft and 198 full-time personnel and an increase of 600 part-time reservists for one weekend a month under the BRAC action at Fairchild AFB. The decrease in aircraft operations could result in minor beneficial effects (USAF 2005). In addition, an increase in vehicle traffic from increased personnel, would raise the ambient noise environment. There would not be an increase in aircraft operations or vehicle traffic under the IDEA.

Table 5-1. Projects Sited/Ongoing 2006/2007 Projects with Completed EAs

Project Number	Project Title	Area of Development	Project Size (ft^2)
Demolition Projects			
GJKZ050015	Remove Asbestos/Demolish Building 2092	COM	20,000
GJKZ 060009	Demolish Furniture Store, Building 620	ADM	22,000
GJKZ 070005P1/ GJKZ070005P2	Demolish Dormitories, Building 622 and 623	ADM	67,320
Construction Projects			
GJKZ030080	Construct Resistance Training Facility	SS	28,000
CAR 07-64594	Construct Armed Forces Reserve Center Area Maintenance Support Activity (AMSA)/Organizational Maintenance Shop (OMS)/Unh Storage (BRAC)	AIO	156,000
GJKZ050069	Construct Vehicle Storage/Maintenance Facility, Ruby Creek	SS	5,000
GJKZ050076	Construct Vehicle/Equipment Storage Facility, EOD Building 2096	AIO	3,800
Infrastructure Projects			
GJKZ040035	Replace Jet Fuel Transfer Line/Upgrade Truck Off-Load	INFRA	11,000 (Linear feet)

Noise impacts from the IDEA include short-term increases in noise levels from construction projects, including those projects that are anticipated to occur under the BRAC action and those that have ongoing or recently completed NEPA analysis. These impacts could effect the on-installation population. However, as previously mentioned, the noise impacts in the IDEA and ongoing or recently completed NEPA projects are temporary; therefore cumulative noise effects would also be temporary and dispersed over time.

Air Quality. The net loss of 8 aircraft would result in minor beneficial effects as a result of decreased aircraft operations. Decreased aircraft would also decrease maintenance activities, such as painting and corrosion control, that result in air emissions. Increased personnel (loss of 198 full-time personnel and a gain of 600 part-time reservists) would result in minor adverse effects from mobile source emissions from automobiles. Short-term adverse effects on air quality would be expected as result of the construction and demolition activities from the IDEA and ongoing or recently completed NEPA projects. Air emissions would not be expected to result in significant cumulative effects on air quality and Spokane County is expected to remain in attainment for all criteria pollutants.

Safety. The proposed installation development activities would increase construction safety risks. There would be a long-term beneficial effect on safety from the decrease in aircraft operations. These short-term and long-term safety risks would not be cumulatively significant.

Geological Resources. Cumulative short- and long-term adverse effects on geological resources would be expected. The proposed installation development and other construction and demolition activities would result in short-term adverse effects associated with increased soil runoff and sedimentation. The

addition of new pavement (e.g., sidewalks, roads, and parking lots) would result in long-term adverse effects to soil productivity. The loss in aircraft and personnel associated with BRAC would not be expected to affect geological resources.

Water Resources. The proposed installation development and other construction and demolition activities would result in short-term adverse effects associated with increased soil runoff and sedimentation, and long-term effects associated with the increase in impervious surfaces and potential new sources of water pollution (e.g., expansion of car wash building and construction of shopette/gas station). Long-term beneficial effects to water resources from conservation would be expected from the replacement of degraded water pipelines from Ft. Wright to Fairchild AFB and upgrading and replacing the AETC Survival School water infrastructure. Proposed IDEA projects would not be expected to increase potable water consumption. Other meaningful observations are: (1) upgrades in infrastructure increase water conservation by repairing the leaking aged system and (2) emphasis on water conserving landscapes for new construction decreases water consumption. No significant cumulative adverse effects on water resources would be expected.

Biological Resources. No cumulative effects on biological resources would be expected. New construction is limited to existing developed areas which would minimize effects to existing native vegetation and animal habitat. Negligible to no adverse effects on biological resources were identified as a result of the proposed installation development activities, and ongoing or recently completed NEPA projects. Furthermore, the loss in aircraft and personnel associated with BRAC would not be expected to affect biological resources.

Cultural Resources. No cumulative effects on cultural resources would be expected. There is the potential for adverse effects associated with modifications to NRHP-eligible buildings (e.g., demolition of buildings and an addition to a building within the proposed Deep Creek historic district, modification/addition to Building 2050). The effects are mitigated through consultation with SHPO but it should not be ignored that these historic buildings would change due to the need for improvement at Fairchild AFB.

Socioeconomics and Environmental Justice. Minor beneficial cumulative effects would be expected. Construction expenditures associated with the proposed IDEA projects and other ongoing or recently analyzed NEPA projects would result in minor beneficial effects. The proposed loss in personnel would have a long-term minor adverse effect on the local economy. The loss of civilian authorizations could be a long-term adverse effect if civilians left the socioeconomic ROI for other employment opportunities. Spokane is an urban area, so the influence of 198 people would be minor in the surrounding Spokane community.

Infrastructure. Long-term beneficial cumulative effects would be expected. The proposed IDEA projects and ongoing or recently analyzed NEPA projects would repair and upgrade roads, utilities, and facilities so they can support the mission at Fairchild AFB.

Hazardous Materials and Wastes. Minor adverse cumulative effects could occur as a result of the short- and long-term increases in hazardous materials and wastes. The loss in aircraft would decrease the amount of petroleum and hazardous materials that are used, therefore lowering the risk of a spill or contamination. No significant change in hazardous waste usage or waste management would be required over time as the Proposed Action is implemented. Growth of industrial uses adjacent to the installation could increase hazardous waste and waste management requirements for the local area. Fairchild AFB is not expected to add to this increase over the existing usage. No significant cumulative adverse effects on hazardous materials and waste management would be expected.

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6. Preparers

This EA has been prepared under the direction of the HQ AMC and the 92 ARW at Fairchild AFB by engineering-environmental Management, Inc (e^2M). The individual preparers of this document are listed below.

Domenick Alario
B.A. Geography
Years of Experience: 2

Louise Baxter
M.P.A. Public Administration
B.S. Political Science
Years of Experience: 18

Shannon Cauley
B.S. Geology
USACE Certified Wetland Delineator
Certified Professional Soil Scientist
Years of Experience: 22

Suanne Collinsworth
M.S. Environmental Sciences and Engineering
B.S. Geology
Certificate of Water Quality Management
Years of Experience: 7

Dr. Sue Goodfellow
Ph.D. Anthropology
B.A. Anthropology and Archeology
Years of Experience: 20

Stuart Gottlieb
B.A. Geography
GIS Professional Certificate
Years of Experience: 4

Shawn Gravatt
M.S. Environmental Studies
B.S. Earth Science and Geography
Years of Experience: 10

Brian Hoppy
B.S. Biology
Certificate of Environmental Management
Years of Experience: 15

Daniel Koenig
B.S. Environmental Policy and Planning
Years of Experience: 2

Sean McCain
M.B.A. Business Administration
B.S. Forestry and Natural Resources Management
Years of Experience: 11

Dr. Michael Moran
Ph.D. Biochemistry
B.S. Chemistry
Registered Environmental Manager (REM)
Years of Experience: 23

Tanya Perry
B.S. Environmental Science
B.A. Communications
Years of Experience: 6

Devin Scherer
B.S. Biology
Years of Experience: 2

Lauri Watson
B.S. Environmental Science
Years of Experience: 4

Jeffrey Weiler
M.S. Resources Economics/Environmental Management
B.A. Political Science
Years of Experience: 32

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APPENDIX A

LIST OF PROPOSED PROJECTS FOR FAIRCHILD AFB

APPENDIX A

Proposed Facilities Demolition Projects

Project Number	Project Title	FY	Area of Development	Project Size (ft^2)	Impervious Surface (ft^2)
Representative Demolition Projects					
GJKZ902509	D1. Demolish CE Complex (Building 2451)	2008	COM	173,443	173,443
Not Known	D2. Demolish Buildings 1, 2, 3, and 8	2011	JPRA	100,000	100,000
GJKZ 050099	D3. Demolish Clinic (Building 615 and 617)	2007	ADM	50,000	50,000
All Other Demolition Projects					
GJKZ860009Y	D4. Demolish Columbia Center (Building 2285)		ADM	38,166	38,166
GJKZ030058P1	D5. Demolish Excess Runway AC Shoulders	2009	AIO		
Not Known	D6. Demolish PMEL (Building 2135)		AIO	14,600	14,600
Not Known	D7. Demolish Buildings 1324, 1334, 1342, and 1350		SS	40,500	40,500
Not Known	D8. Demolish Shopette (Building 2383)		COM	6,060	6,060
			Total Square Feet	**422,769**	**422,769**

Land Use Categories: ADM = Administrative, AIO = Airfield and Industrial Operations, COM = Community, JPRA = Joint Personnel Recovery Agency, INFRA = Infrastructure, NA = Not Available, SS = Survival School, WANG = Washington Air National Guard

Proposed Facilities Construction Projects (continued)

Project Number	Project Title	FY	Area of Development	Project Size (ft^2)	Impervious Surface (ft^2)
Representative Construction Projects					
GJKZ902509	C1. Construct CE Complex	2006	AIO	184,000	184,000
GJKZ030005	C2. Construct Physical Fitness Center/Sports Complex	2008	COM	96,000	96,000
GJKZ040009	C3. Construct Pipeline Dormitory, Fairchild AFB School	2010	SS	82,000	82,000
All Other Construction Projects					
GJKZ920012	C4. Construct Mission Support Complex	2008	AIO	60,000	30,000
GJKZ870011Z	C5. Construct Water Survival Training Facility	2011	SS	60,000	60,000
GJKZ080003Z	C6. Construct School Age Facility	2009	COM	53,000	26,500
GJKZ860009Y	C7. Construct Columbia Center		ADM	46,000	46,000
GJKZ969505	C8. Construct Logistics Support Complex (WANG)	2012	AIO	45,000	22,500
GJKZ870001Z	C9. Construct Visiting Quarters (After Demolition of Buildings 2392 and 2393)	2011	COM	42,000	21,000
GJKZ060002	C10. Construct Consolidated Skills Center	2009	COM	30,000	15,000
GJKZ000042	C11. Construct Isolated Personnel Training Compound	2009	JPRA	29,000	29,000
GJKZ060007	C12. Construct C-2 Facility West	2010	JPRA	25,000	12,500
GJKZ050054	C13. Construct Peacetime/ Government Hostage Detention Lab		SS	21,000	21,000
GJKZ880009	C14. Construct Recreation Center (After Demolition of Building 2185)		COM	18,000	18,000

Land Use Categories: ADM = Administrative, AIO = Airfield and Industrial Operations, COM = Community, JPRA = Joint Personnel Recovery Agency, INFRA = Infrastructure, NA = Not Available, SS = Survival School, WANG = Washington Air National Guard

Proposed Facilities Construction Projects (continued)

Project Number	Project Title	FY	Area of Development	Project Size (ft^2)	Impervious Surface (ft^2)
GJKZ060008	C15. Construct Personnel Recovery Training Facility Phase II: Instructor Resource Annex	2010	JPRA	18,000	18,000
Not Known	C16. Add to/Alter Fairchild Special Operations Center Building 15	2012	JPRA	16,000	16,000
GJKZ040007	C17. Construct Academic Exhibit Facility	2010	SS	12,000	12,000
Not Known	C18. Construct Field Operations and Training Storage Building	2010	JPRA	11,000	11,000
GJKZ880015	C19 Construct Physiological Training (PTU) Facility (After Demolition of Building 2001)	2012	AIO	11,000	11,000
4916-04-000003	C20. Construct Shoppette/Gas Service Station		COM	5,000	5,000
GJKZ050061A	C21. Construct Force Development Sem. Center, ALS/FTAC, Building 716	2007	ADM	5,000	5,000
Not Known	C22. Add to Survival Dining Facility		SS	5,000	5,000
GJKZ010021A	C23. Add to Survival Fitness Center		SS	3,000	3,000
GJKZ040018	C24. Construct AGE Test Pad, Building 2050	2009	AIO	3,000	0
W/O 31190	C25. Add to Car Wash	2010	COM	2,500	2,500
GJKZ040065	C26. Add to/Alter Parachute Training Building 1254		SS	2,000	2,000
GJKZ060033	C27. Add to/Alter Pest Management Facility, Building 2415	2009	AIO	1,000	1,000
GJKZ030021	C28. Add to/Alter Logistics Complex, Building 2050	2007	WANG	1,000	1,000
			Total Square Feet	**877,500**	**756,000**

Land Use Categories: ADM = Administrative, AIO = Airfield and Industrial Operations, COM = Community, JPRA = Joint Personnel Recovery Agency, INFRA = Infrastructure, NA = Not Available, SS = Survival School, WANG = Washington Air National Guard

Proposed Facilities Infrastructure Projects

Project Number	Project Title	FY	Area of Development	Project Size	Impervious Surface
Representative Infrastructure Projects					
GJKZ920012	I1. Upgrade and Replace Survival School Water Infrastructure, 300,000 gallon tank and water lines	2006	SS	14,450 linear feet	0
GJKZ020043	I2. Upgrade Water System Between the Wells and Installation	2009	INFRA	63,000 linear feet	0
Not Known	I3. Upgrade Family Campground (FAMCAMP), 32 concrete pads	2009	COM	28,000 (ft^2)	28,000 ft^2
Other Infrastructure Project					
GJKZ050104A	I4. Extend installation-wide Energy Management Control System	2007	INFRA		0
			Total Distance/Area Affected	**77,450 linear feet/ 28,000 ft^2**	**28,000 ft^2**

Land Use Categories: ADM = Administrative, AIO = Airfield and Industrial Operations, COM = Community, JPRA = Joint Personnel Recovery Agency, INFRA = Infrastructure, NA = Not Available, SS = Survival School, WANG = Washington Air National Guard

APPENDIX B

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

Appendix B

Applicable Laws, Regulations, Policies, and Planning Criteria

When considering the affected environment, the various physical, biological, economic, and social environmental factors must be considered. In addition to the National Environmental Policy Act (NEPA), there are other environmental laws and Executive Orders (EOs) to be considered when preparing environmental analyses. These laws are summarized below.

Noise

The Air Installation Compatible Use Zone (AICUZ) Program, (Air Force Instruction [AFI] 32-7063), provides guidance to air installations and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near U.S. Air Force (USAF) installations.

Land Use

Land use planning in the USAF is guided by *Land Use Planning Bulletin, Base Comprehensive Planning* (HQ USAF/LEEVX, August 1, 1986). This document provides for the use of 12 basic land use types found on an Air Force installation. In addition, land use guidelines established by the U.S. Department of Housing and Urban Development (HUD) and based on findings of the Federal Interagency Committee on Noise (FICON) are used to recommend acceptable levels of noise exposure for land use.

Air Quality

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990 recognize that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of the Nation's air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQS) which regulate carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and designates this responsibility to state and local governments. States are directed to utilize financial and technical assistance as well as leadership from the Federal government to develop implementation plans to achieve NAAQS. Geographic areas are officially designated by USEPA as being in attainment or nonattainment to pollutants in relation to their compliance with NAAQS. Geographic regions established for air quality planning purposes are designated as Air Quality Control Regions (AQCRs). Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassifiable. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action could have on NAAQS due to short-term increases in air pollution during construction as well as long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency may also be subject to USEPA's Prevention of Significant Deterioration (PSD) regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states all Federal agencies will comply with all Federal- and state-approved requirements.

Safety

AFI 91-202, *USAF Mishap Prevention Program*, implements Air Force Policy Directive (AFPD) 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities.

Water Resources

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specified contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits are issued by USEPA or the appropriate state if it has assumed responsibility. Section 404 of the CWA establishes a Federal program to regulate the discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE). Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands that are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility occupation.

Section 303(d) of the CWA requires states and USEPA to identify waters not meeting state water-quality standards and to develop Total Maximum Daily Loads (TMDLs). A TMDL is the maximum amount of a pollutant that a waterbody can receive and still be in compliance with state water-quality standards. After determining TMDLs for impaired waters, states are required to identify all point and nonpoint sources of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source in order to meet the state standards. The TMDL program is currently the Nation's most comprehensive attempt to restore and improve water quality. The TMDL program does not explicitly require the protection of riparian areas. However, implementation of the TMDL typically calls for restoration of riparian areas as one of the required management measures for achieving reductions in nonpoint source pollutant loadings.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require the USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set current Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the governor of the state(s) through which the river flows.

Biological Resources

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate State Fish and Wildlife office. Some species, such as the bald eagle, also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, as amended, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. The MBTA also makes it unlawful to ship, transport or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 11514, *Protection and Enhancement of Environmental Quality* (March 5, 1970), states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, *Protection of Wetlands* (May 24, 1977), directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

EO 13186, *Conservation of Migratory Birds* (January 10, 2001), creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. EO 13186 provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. EO 13186 provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). EO 13186 will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. EO 13186 requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

Cultural Resources

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archeological Resource Protection Act (ARPA) of 1979 protects archeological resources on public and American Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archeological resources between governmental agencies, the professional archeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the NHPA directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally owned cultural properties. Section 106 of the act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

NAGPRA establishes rights of American Indian tribes to claim ownership of certain "cultural items," defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on Federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined, and then the tribe

owning the land where the items were discovered or the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate American Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, *Protection and Enhancement of the Cultural Environment* (May 13, 1971), directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which could qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally owned sites listed on the NRHP.

EO 13007, *Indian Sacred Sites* (May 24, 1996), provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate American Indian religious practitioners' access to and ceremonial use of American Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13287, *Preserve America* (March 3, 2003), orders Federal agencies to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. EO 13287 established new accountability for agencies with respect to inventories and stewardship.

Socioeconomics and Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address the adverse human health or environmental effects that its activities have on minority and low-income populations, and develop agencywide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health of and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations." A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with EO 12898 is with each Federal agency.

Hazardous Materials and Waste

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is

authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes, redesigning products, substituting raw materials, and making improvements in management techniques, training, and inventory control. EO 12856, *Federal Compliance with Right-to Know Laws and Pollution Prevention Requirements* (August 3, 1993) requires Federal agencies to comply with the provisions of the PPA and requires Federal agencies to ensure all necessary actions are taken to prevent pollution. In addition, in *Federal Register* Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to "incorporate pollution prevention principles, techniques, and mechanisms into their planning and decision making processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA."

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for "cradle-to-grave" management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive, toxic, or listed by USEPA as being hazardous. With the Hazardous and Solid Waste Amendments (HSWA) of 1984, Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA amendments strengthen control of both hazardous and nonhazardous waste and emphasize the prevention of pollution of groundwater.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards and authorizes the USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the Emergency Planning and Community Right to Know Act (EPCRA), which requires facility operators with "hazardous substances" or "extremely hazardous substances" to prepare comprehensive emergency plans and to report accidental releases. EO 12856 requires Federal agencies to comply with the provisions of EPCRA. If a Federal agency acquires a contaminated site, it can be held liable for clean-up as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as "owners." However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it can claim the "innocent purchaser" defense under CERCLA. According to Title 42 U.S. Code (U.S.C.) 9601(35), the current owner/operator must show it undertook "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" before buying the property to use this defense.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorized USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singled out polychlorinated bi-phenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and can cause adverse health effects in humans. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, clean-up, and release reporting requirements for numerous chemicals like PCBs. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response," which applies only to schools. TSCA Title III, "Indoor Radon Abatement," states indoor air in buildings of the United States should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction," directs Federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable

monitoring, detection, and abatement of lead-based paint and other lead exposure hazards." Further, any Federal agency having jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

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APPENDIX C

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING CORRESPONDENCE AND DISTRIBUTION LIST

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MEMORANDUM FOR: SEE DISTRIBUTION

08 JUN 2006

FROM: HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

SUBJECT: Description of Proposed Action and Alternatives for the Installation Development Environmental Assessment at Fairchild Air Force Base, Washington

1. The Air Mobility Command is preparing an Installation Development Environmental Assessment (IDEA) at Fairchild AFB consistent with the Wing Commander's Vision. Numerous future projects are proposed to ensure Fairchild AFB can conduct required operations to preserve our national security. Under the Proposed Action, projects to accomplish capital improvements and upgrades to community living and recreation areas, infrastructure, and utilities and to demolish aging facilities are planned for execution over the next five years. The Description of Proposed Action and Alternatives (DOPAA) is included with this correspondence.

2. The environmental impact analysis process for the DOPAA is being conducted by the Air Mobility Command in accordance with the Council on Environmental Quality regulations pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your review of the attached DOPAA and solicit your comments on it and any potential environmental consequences. Also enclosed is the distribution list of the other Federal, state, and local agencies contacted. If you feel any additional agencies should review this DOPAA, please forward these materials.

3. Please provide any comments or information directly to HQ AMC/A7P, 507 Symington Drive, Scott AFB, IL 62225-5022 within 30 calendar days upon receipt of this notification.

4. If members of your staff have any questions, our point of contact is Mr. Mark Fetzer, HQ AMC/A7PC, 618-229-0843, or e-mail to *mark.fetzer.ctr@scott.af.mil*.

Michael W. Hutchison

MICHAEL W. HUTCHISON, Colonel, USAF
Chief, Plans and Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

DISTRIBUTION: (listed on next page)

AMC— GLOBAL REACH FOR AMERICA

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Interagency and Intergovernmental Coordination for Environmental Planning List

State and Local Elected Officials

The Honorable Phillip D. Harris
Commissioner
County of Spokane, Third District
Spokane County Courthouse
1116 West Broadway Ave.
Spokane, WA 99260

Federal Agency Contacts

Mr. Mark Bagdovitz
Chief, Habitat Conservation and Forest
Resources
U.S. Fish and Wildlife Service, Region 1
Eastside Federal Complex
911 N.E. 11th Ave.
Portland, OR 97232-4181

Ms. Judith Leckrone Lee
Environmental Review Coordinator
U.S. Environmental Protection Agency
Region 10
1200 Sixth Ave.
Seattle, WA 98101

State and Local Agency Contacts

Dr. Allyson Brooks
State Historic Preservation Officer
Office of Archeology and Historic Preservation
P.O. Box 48343
Olympia, WA 98504-8343

Mr. John Mercer
Director, Spokane Planning Services
City of Spokane
808 W. Spokane Falls Blvd.
3rd Floor City Hall
Spokane, WA 99201

Ms. Barbara Ritchie
SEPA Unit Supervisor
Washington Department of Ecology
Environmental Review Section
P.O. Box 47703
Olympia, WA 98504-7703

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CITY OF SPOKANE
PLANNING SERVICES
808 W. SPOKANE FALLS BLVD.
SPOKANE, WASHINGTON 99201-3329
(509) 625-6060
FAX (509) 625-6013
www.spokaneplanning.org

August 1, 2006

HQ AMC/A7PC
507 Symington Drive
Scott AFB, IL 62225-5022

Attn: Mark Fetzer

Re: Description of Proposed Action and Alternatives for the Installation Development Environmental Assessment at Fairchild Air Force Base, Washington

Dear Mr. Fetzer:

This letter is to inform you that the Planning Services Department, City of Spokane, has reviewed the above-referenced document and we do not have any comments or any other information to provide at this time.

If you should have any questions please don't hesitate to call.

Sincerely,

Steve Franks

Steve Franks, AICP, Director
Planning Services

Steve - thank you for the opportunity to review.

"We work with the community to achieve its desired future, measuring our progress by the vitality of Spokane's economy, the health of its physical environment, and opportunities for all citizens to improve their quality of life."

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

August 2, 2006

Colonel Michael W. Hutchison, Chief
Plans and Programs Division
Directorate of Installations & Mission Support
Department of the Air Force
Headquarters Air Mobility Command
HQ AMC/A7P
507 Symington Drive
Scott Air Force Base, Illinois 6225-5022

In future correspondence please refer to:
Log: 080106-06-USAF
Property: Fairchild Air Force Base
Re: Installation Development Environmental Assessment

Dear Colonel Hutchison:

We have reviewed the Description of Proposed Action and Alternatives for Installation Development at Fairchild Air Force Base forwarded to our office for the proposed project referenced above. Based upon information in the document as well as previous survey work conducted at Fairchild AFB, we are aware that there are both archaeological and historic properties that may be affected by this action. Therefore, we recommend identification of the area of potential effect, a comprehensive identification of archaeological and historic properties that have potential to be affected by this action, and your determination of effect of the proposed action on all such resources that are eligible for listing in the National Register of Historic Places.

We also recommend consultation with the concerned tribes cultural committees and staff regarding cultural resource issues. Also we would appreciate receiving any correspondence or comments from concerned tribes or other parties concerning cultural resource issues that you receive.

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment on this project and we look forward to receiving the survey report. Please note that DAHP has recently revised our cultural resource reporting guidelines. The guidelines are available on our website at http://www.oahp.wa.gov/pages/Documents/documents/CRStandards_004.pdf. Should you have any questions, please feel free to contact me at (360) 586-3073 or email at greg.Griffith@dahp.wa.gov.

Sincerely,

Gregory Griffith
Deputy State Historic Preservation Officer

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION
Protect the Past. Shape the Future

APPENDIX D

GENERAL CONFORMITY AIR QUALITY EMISSIONS ESTIMATES (SAMPLE CALCULATION)

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

		Construction Emissions from Proposed Action				
		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
Worst Case Scenario	Construction Combustion	19.312	5.737	40.700	1.010	1.177
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	29.513
	TOTAL Worst Case Scenario	19.312	5.737	40.700	1.010	30.690

		Construction Emissions from Proposed Action				
		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
Average Year Scenario	Construction Combustion	4.660	1.086	5.462	0.134	0.157
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	29.513
	TOTAL Average Year Scenario	4.660	1.086	5.462	0.134	29.670

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
Worst Case Scenario Emissions	19.312	5.737	40.700	1.010	30.690
Proposed Action %	**0.0359%**	**0.00747%**	**0.01093%**	**0.01135%**	**0.0231%**

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
Average Year Scenario	4.660	1.086	5.462	0.134	29.670
Proposed Action %	**0.0087%**	**0.00141%**	**0.00147%**	**0.00151%**	**0.0223%**

Construction Combustion Emissions for Worst Case Scenario

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

1	100% of Construct Civil Engineering Complex 100% of Construct Armed Forces Reserve Center/Area Maintenance Support Activitity/Organization Maintenance	184,000	ft²	4.22	acres
2	Shop/Unheated Storage (BRAC)	156,000	ft²	3.58	acres
3	100% of Construct Physical Fitness Center/Sports Complex	96,000	ft²	2.20	acres
4	100% of Demolish Civil Engineering Complex	173,443	ft²	3.98	acres
5	100% of Demolish Buildings 1,2,3, and 8	100,000	ft²	2.30	acres
6	100% of Demolish Dormitories	67,320	ft²	1.55	acres
7	100% of Replace Jet Fuel Transfer Line/Upgrade Truck-Off Load	33,000	ft²	0.76	acres
8	100% of Upgrade and Replace Survival School Water	43,350	ft²	1.00	acres
9	100% of Upgrade Water System Between the Wells and Main	189,000	ft²	4.34	acres

Total Building Construction Area:	436,000	ft²	(1-3)
Total Demolished Area:	340,763	ft²	(4-6)
Total Paved Area:	0	ft²	(None)
Total Disturbed Area:	1,042,113	ft²	(1-9)
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	3	434.286	64.737	507.348	8.686	14.569
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	22.491	3.872	32.965	0.450	0.626
Building Construction	2	134.443	39.957	312.407	8.087	9.088
Air Compressor for Architectural Coating	2	13.673	3.403	23.301	0.547	1.081
Architectural Coating**			53.815			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	1,042,113	23.92	14	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	340,763	7.82	60	
Building Construction:	436,000	10.01	230	
Architectural Coating	436,000	10.01	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	6,080.00	906.32	7,102.88	121.60	203.97
Paving	-	-	-	-	-
Demolition	1,349.44	232.34	1,977.93	26.99	37.55
Building Construction	30,921.97	9,190.03	71,853.52	1,859.92	2,090.32
Architectural Coatings	273.45	1,144.36	466.03	10.94	21.62
Total Emissions (lbs):	**38,624.86**	**11,473.05**	**81,400.35**	**2,019.45**	**2,353.46**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	38,624.86	11,473.05	81,400.35	2,019.45	2,353.46
Total Project Emissions (tons)	19.31	5.74	40.70	1.01	1.18

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	23.92	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	13.36	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	23.92	NA	17	0.008
Grading	0.80 lbs/acre	23.92	NA	19	0.010
Vehicle Traffic	22.30 lbs/acre	23.92	NA	533	0.267
Erosion of Soil Piles	0.75 lbs/acre/day	23.92	90	1,615	0.807
Erosion of Graded Surface	26.40 lbs/acre/day	23.92	90	56,843	28.421
TOTAL				59,027	29.51

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 184.65 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 23.92 acres/yr (from "CY2007 Combustion" Worksheet)
Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	23.92	2.99
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	23.92	11.70
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	11.96	12.06
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	11.96	4.95
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	23.92	8.39
TOTAL								40.09

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 40.09
Qty Equipment: 3.00
Grading days/yr: 13.36

Construction Combustion Emissions for Worst Case Scenario

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

		Total Year (ft^2)	Average Year (ft^2)		
1	Total Construction Area Over Five Year Period	1,146,600 ft^2	229,320 ft^2	26.32	acres
2	Total Demolition Area Over Five Year Period	470,929 ft^2	94,186 ft^2	10.81	acres
3	Total Infrastructure Area Over Five Year Period (Trenching/Grading)	293,350 ft^2	58,670 ft^2	6.73	acres
4	Total Infrastructure Area Over Five Year Period (Paving)	0 ft^2	0 ft^2	0.00	acres

Note: Average year area was calculated by dividing the total area over a five year time period.

Total Building Construction Area:	229,320 ft^2	(1)
Total Demolished Area:	94,186 ft^2	(2)
Total Paved Area:	0 ft^2	(None)
Total Disturbed Area:	382,176 ft^2	(1-4)
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	53.089	7.914	62.020	1.062	1.781
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	6.216	1.070	9.112	0.124	0.173
Building Construction	1	35.356	5.254	41.079	1.063	1.195
Air Compressor for Architectural Coating	1	3.596	0.447	3.064	0.072	0.142
Architectural Coating**			39.028			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	382,176	8.77	14	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	94,186	2.16	60	
Building Construction:	229,320	5.26	230	
Architectural Coating	229,320	5.26	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	743.24	110.79	868.28	14.86	24.93
Paving	-	-	-	-	-
Demolition	372.98	64.22	546.69	7.46	10.38
Building Construction	8,131.91	1,208.40	9,448.08	244.56	274.86
Architectural Coatings	71.91	789.51	61.28	1.44	2.84
Total Emissions (lbs):	**9,320.05**	**2,172.93**	**10,924.33**	**268.33**	**313.01**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	9,320.05	2,172.93	10,924.33	268.33	313.01
Total Project Emissions (tons)	4.66	1.09	5.46	0.13	0.16

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	23.92	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	13.36	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	23.92	NA	17	0.008
Grading	0.80 lbs/acre	23.92	NA	19	0.010
Vehicle Traffic	22.30 lbs/acre	23.92	NA	533	0.267
Erosion of Soil Piles	0.75 lbs/acre/day	23.92	90	1,615	0.807
Erosion of Graded Surface	26.40 lbs/acre/day	23.92	90	56,843	28.421
TOTAL				59,027	29.51

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 184.65 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 23.92 acres/yr (from "CY2007 Combustion" Worksheet)
Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	23.92	2.99
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	23.92	11.70
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	11.96	12.06
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	11.96	4.95
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	23.92	8.39
TOTAL								40.09

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 40.09
Qty Equipment: 3.00
Grading days/yr: 13.36

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare projec to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.380	0.065	0.546	0.008	0.011
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	4.912
	TOTAL CY2007	0.380	0.065	0.546	0.008	4.923

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.380	0.065	0.546	0.008	4.923
Proposed Action %	**0.0007%**	**0.00008%**	**0.00015%**	**0.00009%**	**0.0037%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Demolish Civil Engineering Complex	173,443	ft²	3.98	acres

Total Building Construction Area:	0	ft²	(None)
Total Demolished Area:	173,443	ft²	
Total Paved Area:	0	ft²	(None)
Total Disturbed Area:	173,443	ft²	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	24.093	3.591	28.147	0.482	0.808
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	11.447	1.971	16.779	0.229	0.319
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	173,443	3.98	3	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	173,443	3.98	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	72.28	10.77	84.44	1.45	2.42
Paving	-	-	-	-	-
Demolition	686.84	118.26	1,006.73	13.74	19.11
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**759.12**	**129.03**	**1,091.17**	**15.18**	**21.54**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	759.12	129.03	1,091.17	15.18	21.54
Total Project Emissions (tons)	0.38	0.06	0.55	0.01	0.01

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	3.98	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	2.22	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	3.98	NA	3	0.001
Grading	0.80 lbs/acre	3.98	NA	3	0.002
Vehicle Traffic	22.30 lbs/acre	3.98	NA	89	0.044
Erosion of Soil Piles	0.75 lbs/acre/day	3.98	90	269	0.134
Erosion of Graded Surface	26.40 lbs/acre/day	3.98	90	9,461	4.730
TOTAL				9,824	4.91

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 1,109.43 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 3.98 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	3.98	0.50
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	3.98	1.95
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.99	2.01
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.99	0.82
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	3.98	1.40
TOTAL								6.67

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 6.67
Qty Equipment: 3.00
Grading days/yr: 2.22

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare prc to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.212	0.036	0.306	0.004	0.006
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	2.832
	TOTAL CY2007	0.212	0.036	0.306	0.004	2.838

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	**VOC (tpy)**	**CO (tpy)**	**SO_2 (tpy)**	**PM_{10} (tpy)**
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.212	0.036	0.306	0.004	2.838
Proposed Action %	**0.0004%**	**0.00005%**	**0.00008%**	**0.00005%**	**0.0021%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Demolish Buildings 1,2,3, and 8	100,000	ft²	2.30	acres

Total Building Construction Area:	0	ft²	(None)
Total Demolished Area:	100,000	ft²	
Total Paved Area:	0	ft²	(None)
Total Disturbed Area:	100,000	ft²	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	13.891	2.071	16.228	0.278	0.466
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	6.600	1.136	9.674	0.132	0.184
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	100,000	2.30	2	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	100,000	2.30	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	27.78	4.14	32.46	0.56	0.93
Paving	-	-	-	-	-
Demolition	396.01	68.18	580.44	7.92	11.02
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**423.79**	**72.32**	**612.90**	**8.48**	**11.95**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	423.79	72.32	612.90	8.48	11.95
Total Project Emissions (tons)	0.21	0.04	0.31	0.00	0.01

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	2.30	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	1.28	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	2.30	NA	2	0.001
Grading	0.80 lbs/acre	2.30	NA	2	0.001
Vehicle Traffic	22.30 lbs/acre	2.30	NA	51	0.026
Erosion of Soil Piles	0.75 lbs/acre/day	2.30	90	155	0.077
Erosion of Graded Surface	26.40 lbs/acre/day	2.30	90	5,455	2.727
TOTAL				5,664	2.83

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 1,924.23 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 2.30 acres/yr (from "CY2007 Combustion" Worksheet)
Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	2.30	0.29
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.30	1.12
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.15	1.16
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.15	0.47
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	2.30	0.81
TOTAL								3.85

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 3.85
Qty Equipment: 3.00
Grading days/yr: 1.28

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
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Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

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Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare pro to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.138	0.024	0.201	0.003	0.004
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	1.907
	TOTAL CY2007	0.138	0.024	0.201	0.003	1.910

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.138	0.024	0.201	0.003	1.910
Proposed Action %	**0.0003%**	**0.00003%**	**0.00005%**	**0.00003%**	**0.0014%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Demolish Dormitories	67,320	ft^2	1.55	acres

Total Building Construction Area:	0	ft^2	(None)
Total Demolished Area:	67,320	ft^2	
Total Paved Area:	0	ft^2	(None)
Total Disturbed Area:	67,320	ft^2	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
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Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

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Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	9.352	1.394	10.925	0.187	0.314
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	4.443	0.765	6.513	0.089	0.124
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	67,320	1.55	1	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	67,320	1.55	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	9.35	1.39	10.92	0.19	0.31
Paving	-	-	-	-	-
Demolition	266.59	45.90	390.75	5.33	7.42
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**275.94**	**47.29**	**401.68**	**5.52**	**7.73**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	275.94	47.29	401.68	5.52	7.73
Total Project Emissions (tons)	0.14	0.02	0.20	0.00	0.00

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	1.55	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	0.86	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	1.55	NA	1	0.001
Grading	0.80 lbs/acre	1.55	NA	1	0.001
Vehicle Traffic	22.30 lbs/acre	1.55	NA	34	0.017
Erosion of Soil Piles	0.75 lbs/acre/day	1.55	90	104	0.052
Erosion of Graded Surface	26.40 lbs/acre/day	1.55	90	3,672	1.836
TOTAL				3,813	1.91

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 2,858.33 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 1.55 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	1.55	0.19
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	1.55	0.76
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	0.77	0.78
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.77	0.32
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	1.55	0.54
TOTAL								2.59

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 2.59
Qty Equipment: 3.00
Grading days/yr: 0.86

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Koot Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	3.330	0.844	3.860	0.099	0.113
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	5.211
	TOTAL CY2007	3.330	0.844	3.860	0.099	5.324

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	3.330	0.844	3.860	0.099	5.324
Proposed Action %	**0.0062%**	**0.00110%**	**0.00104%**	**0.00112%**	**0.0040%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Construct Civil Engineering Complex	184,000	ft²	4.22	acres

Total Building Construction Area:	184,000	ft²	
Total Demolished Area:	0	ft²	(None)
Total Paved Area:	0	ft²	(None)
Total Disturbed Area:	184,000	ft²	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	25.560	3.810	29.860	0.511	0.857
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	28.369	4.216	32.960	0.853	0.959
Air Compressor for Architectural Coating	1	2.885	0.359	2.458	0.058	0.114
Architectural Coating**			34.960			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	184,000	4.22	3	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	184,000	4.22	230	
Architectural Coating	184,000	4.22	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 199

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	76.68	11.43	89.58	1.53	2.57
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	6,524.82	969.59	7,580.88	196.23	220.54
Architectural Coatings	57.70	706.37	49.17	1.15	2.28
Total Emissions (lbs):	**6,659.20**	**1,687.39**	**7,719.62**	**198.92**	**225.39**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	6,659.20	1,687.39	7,719.62	198.92	225.39
Total Project Emissions (tons)	3.33	0.84	3.86	0.10	0.11

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	4.22	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	2.36	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	4.22	NA	3	0.001
Grading	0.80 lbs/acre	4.22	NA	3	0.002
Vehicle Traffic	22.30 lbs/acre	4.22	NA	94	0.047
Erosion of Soil Piles	0.75 lbs/acre/day	4.22	90	285	0.143
Erosion of Graded Surface	26.40 lbs/acre/day	4.22	90	10,036	5.018
TOTAL				10,422	5.21

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 1,045.78 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 4.22 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	4.22	0.53
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	4.22	2.07
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	2.11	2.13
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	2.11	0.87
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	4.22	1.48
TOTAL								7.08

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 7.08
Qty Equipment: 3.00
Grading days/yr: 2.36

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare pro to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	2.823	0.741	3.272	0.084	0.096
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	4.418
	TOTAL CY2007	2.823	0.741	3.272	0.084	4.514

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	2.823	0.741	3.272	0.084	4.514
Proposed Action %	**0.0052%**	**0.00096%**	**0.00088%**	**0.00095%**	**0.0034%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Construct Armed Forces Reserve Center/Area Maintenance Support Activitity/Organization Maintenance Shop/Unheated Storage (BRAC)	156,000	ft^2	3.58	acres

Total Building Construction Area:	156,000	ft^2	
Total Demolished Area:	0	ft^2	(None)
Total Paved Area:	0	ft^2	(None)
Total Disturbed Area:	156,000	ft^2	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	21.670	3.230	25.316	0.433	0.727
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	24.052	3.574	27.945	0.723	0.813
Air Compressor for Architectural Coating	1	2.446	0.304	2.084	0.049	0.097
Architectural Coating**			32.190			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	156,000	3.58	3	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	156,000	3.58	230	
Architectural Coating	156,000	3.58	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 199

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	65.01	9.69	75.95	1.30	2.18
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	5,531.91	822.04	6,427.26	166.37	186.98
Architectural Coatings	48.92	649.89	41.69	0.98	1.93
Total Emissions (lbs):	**5,645.84**	**1,481.62**	**6,544.90**	**168.65**	**191.09**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	5,645.84	1,481.62	6,544.90	168.65	191.09
Total Project Emissions (tons)	2.82	0.74	3.27	0.08	0.10

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	3.58	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	2.00	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spok
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p.	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	3.58	NA	3	0.001
Grading	0.80 lbs/acre	3.58	NA	3	0.001
Vehicle Traffic	22.30 lbs/acre	3.58	NA	80	0.040
Erosion of Soil Piles	0.75 lbs/acre/day	3.58	90	242	0.121
Erosion of Graded Surface	26.40 lbs/acre/day	3.58	90	8,509	4.255
TOTAL				8,836	4.42

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 1,233.48 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 3.58 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	3.58	0.45
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	3.58	1.75
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.79	1.81
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.79	0.74
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	3.58	1.26
TOTAL								6.00

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 6.00
Qty Equipment: 3.00
Grading days/yr: 2.00

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emis
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	1.731	0.509	2.006	0.052	0.059
	Construction Fugitive Dust	0.000	0.000	0.000	0.000	2.719
	TOTAL CY2007	1.731	0.509	2.006	0.052	2.777

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	1.731	0.509	2.006	0.052	2.777
Proposed Action %	**0.0032%**	**0.00066%**	**0.00054%**	**0.00058%**	**0.0021%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Construct Physical Fitness Center/Sports Complex	96,000	ft^2	2.20	acres

Total Building Construction Area:	96,000	ft^2	
Total Demolished Area:	0	ft^2	(None)
Total Paved Area:	0	ft^2	(None)
Total Disturbed Area:	96,000	ft^2	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	13.336	1.988	15.579	0.267	0.447
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	14.801	2.199	17.197	0.445	0.500
Air Compressor for Architectural Coating	1	1.505	0.187	1.283	0.030	0.060
Architectural Coating**			25.252			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	96,000	2.20	2	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	96,000	2.20	230	
Architectural Coating	96,000	2.20	20	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	26.67	3.98	31.16	0.53	0.89
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	3,404.25	505.87	3,955.24	102.38	115.06
Architectural Coatings	30.10	508.78	25.65	0.60	1.19
Total Emissions (lbs):	**3,461.03**	**1,018.63**	**4,012.05**	**103.52**	**117.15**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	3,461.03	1,018.63	4,012.05	103.52	117.15
Total Project Emissions (tons)	1.73	0.51	2.01	0.05	0.06

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	2.20	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	1.23	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	2.20	NA	2	0.001
Grading	0.80 lbs/acre	2.20	NA	2	0.001
Vehicle Traffic	22.30 lbs/acre	2.20	NA	49	0.025
Erosion of Soil Piles	0.75 lbs/acre/day	2.20	90	149	0.074
Erosion of Graded Surface	26.40 lbs/acre/day	2.20	90	5,236	2.618
TOTAL				5,438	2.72

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 2,004.40 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 2.20 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	2.20	0.28
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.20	1.08
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	1.10	1.11
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.10	0.46
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	2.20	0.77
TOTAL								3.69

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 3.69
Qty Equipment: 3.00
Grading days/yr: 1.23

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
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Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
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*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.0023	0.0003	0.0027	0.0000	0.0001
	Construction Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.9346
	TOTAL CY2007	0.0023	0.0003	0.0027	0.0000	0.9347

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.0023	0.0003	0.0027	0.0000	0.9347
Proposed Action %	**0.0000%**	**0.00000%**	**0.00000%**	**0.00000%**	**0.0007%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Replace Jet Fuel Transfer Line/Upgrade Truck-Off Load	33,000 ft²	0.76	acres

Total Building Construction Area:	0 ft²	(None)
Total Demolished Area:	0 ft²	(None)
Total Paved Area:	0 ft²	(None)
Total Disturbed Area:	33,000 ft²	
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	

Assumption:

Trench for utility line would be 3 feet wide by 11,000 linear feet

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
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Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

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Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	4.584	0.683	5.355	0.092	0.154
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	33,000	0.76	1	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	4.58	0.68	5.36	0.09	0.15
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**4.58**	**0.68**	**5.36**	**0.09**	**0.15**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	4.58	0.68	5.36	0.09	0.15
Total Project Emissions (tons)	0.00	0.00	0.00	0.00	0.00

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	0.76	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	0.42	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-9	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	0.76	NA	1	0.000
Grading	0.80 lbs/acre	0.76	NA	1	0.000
Vehicle Traffic	22.30 lbs/acre	0.76	NA	17	0.008
Erosion of Soil Piles	0.75 lbs/acre/day	0.76	90	51	0.026
Erosion of Graded Surface	26.40 lbs/acre/day	0.76	90	1,800	0.900
TOTAL				1,869	0.93

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 5,830.99 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 0.76 acres/yr (from "CY2007 Combustion" Worksheet)
Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	0.76	0.09
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	0.76	0.37
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	0.38	0.38
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.38	0.16
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	0.76	0.27
TOTAL								1.27

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 1.27
Qty Equipment: 3.00
Grading days/yr: 0.42

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emission
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.0030	0.0004	0.0035	0.0001	0.0001
	Construction Fugitive Dust	0.0000	0.0000	0.0000	0.0000	0.0115
	TOTAL CY2007	0.0030	0.0004	0.0035	0.0001	0.0116

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.0030	0.0004	0.0035	0.0001	0.0116
Proposed Action %	**0.0000%**	**0.00000%**	**0.00000%**	**0.00000%**	**0.0000%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Upgrade and Replace Survival School Water	43,350	ft^2	1.00	acres

on-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used	0	ft^2	(None)
to compare project to regional emissions.	0	ft^2	(None)
Total Paved Area:	0	ft^2	(None)
Total Disturbed Area:	43,350	ft^2	
Construction Duration:	1.0	year(s)	
Annual Construction Activity:	230	days/yr	

Assumption:

Trench for utility line would be 3 feet wide by 14,450 linear feet

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	6.022	0.898	7.035	0.120	0.202
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	43,350	1.00	1	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	6.02	0.90	7.03	0.12	0.20
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**6.02**	**0.90**	**7.03**	**0.12**	**0.20**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	6.02	0.90	7.03	0.12	0.20
Total Project Emissions (tons)	0.00	0.00	0.00	0.00	0.00

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	1.00	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	0.56	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	Summarizes tc	assumed days/yr graded area is exposed	
Grading Hours/day:	to compare prc	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	0	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	0 hr/acre	0.00 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission	Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.00	lbs/acre	1.00	NA	0	0.000
Grading	0.80	lbs/acre	1.00	NA	1	0.000
Vehicle Traffic	22.30	lbs/acre	1.00	NA	22	0.011
Erosion of Soil Piles	0.75	lbs/acre/day	1.00	Summarizes	0	0.000
Erosion of Graded Surface	26.40	lbs/acre/day	1.00	Summarizes	0	0.000
TOTAL					23	0.01

Soil Disturbance EF: 23.10 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 41.56 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 1.00 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	1.00	0.12
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	1.00	0.49
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	0.50	0.50
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.50	0.21
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	1.00	0.35
TOTAL								1.67

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 1.67
Qty Equipment: 3.00
Grading days/yr: 0.56

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR													
6	Tier Reports for 2001, to be used	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	to compare project to regional emissions.	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.

Summary	Summarizes total emissions by calendar year.
Combustion	Estimates emissions from non-road equipment exhaust as well as painting.
Fugitive	Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust.
Grading	Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissio
AQCR Tier Report	Summarizes total emissions for the Eastern Washington-Northern Idaho Interstate AQCR Tier Reports for 2001, to be used to compare project to regional emissions.

Construction Emissions from Proposed Action

		NO_x (ton)	VOC (ton)	CO (ton)	SO_2 (ton)	PM_{10} (ton)
CY2007	Construction Combustion	0.0394	0.0059	0.0460	0.0008	0.0013
	Construction Fugitive Dust	0.0000	0.0000	0.0000	0.0000	5.3526
	TOTAL CY2007	0.0394	0.0059	0.0460	0.0008	5.3539

Since future year budgets were not readily available, actual 2001 air emissions inventories for the counties were used as an approximation of the regional inventory. Because the Proposed Action is several orders of magnitude below significance, the conclusion would be the same, regardless of whether future year budget data set were used.

Eastern Washington-Northern Idaho Interstate AQCR

	Point and Area Sources Combined				
Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
2001	53,801	76,830	372,308	8,894	133,126

Source: USEPA-AirData NET Tier Report (http://www.epa.gov/air/data/geosel.html). Site visited on 4 April 2006.

Determination Significance (Significance Threshold = 10%) for Construction Activities

	Point and Area Sources Combined				
	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)
Minimum - 2001	53,801	76,830	372,308	8,894	133,126
2007 Emissions	0.0394	0.0059	0.0460	0.0008	5.3539
Proposed Action %	**0.0001%**	**0.00001%**	**0.00001%**	**0.00001%**	**0.0040%**

Construction Combustion Emissions for CY 2007

Combustion Emissions of VOC, NO_x, SO_2, CO and PM_{10} Due to Construction

Includes:

100% of Upgrade Water System Between the Wells and Main	189,000 ft²	4.34	acres

Total Building Construction Area:	0 ft²	(None)
Total Demolished Area:	0 ft²	(None)
Total Paved Area:	0 ft²	(None)
Total Disturbed Area:	189,000 ft²	
Construction Duration:	1.0 year(s)	
Annual Construction Activity:	230 days/yr	

Assumption:

Trench for utility line would be 3 feet wide by 63,000 linear feet

Emission Factors Used for Construction Equipment

Reference: Guide to Air Quality Assessment, SMAQMD, 2004

Emission factors are taken from Table 3-2. Assumptions regarding the type and number of equipment are from Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Bulldozer	1	29.40	3.66	25.09	0.59	1.17
Motor Grader	1	10.22	1.76	14.98	0.20	0.28
Water Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	3	60.51	9.02	70.69	1.21	2.03

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Paver	1	7.93	1.37	11.62	0.16	0.22
Roller	1	5.01	0.86	7.34	0.10	0.14
Total per 10 acres of activity	2	12.94	2.23	18.96	0.26	0.36

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Loader	1	7.86	1.35	11.52	0.16	0.22
Haul Truck	1	20.89	3.60	30.62	0.42	0.58
Total per 10 acres of activity	2	28.75	4.95	42.14	0.58	0.80

Building Construction

Equipment[d]	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Stationary						
Generator Set	1	11.83	1.47	10.09	0.24	0.47
Industrial Saw	1	17.02	2.12	14.52	0.34	0.68
Welder	1	4.48	0.56	3.83	0.09	0.18
Mobile (non-road)						
Truck	1	20.89	3.60	30.62	0.84	0.58
Forklift	1	4.57	0.79	6.70	0.18	0.13
Crane	1	8.37	1.44	12.27	0.33	0.23
Total per 10 acres of activity	6	67.16	9.98	78.03	2.02	2.27

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/day)	VOC[b] (lb/day)	CO (lb/day)	SO_2[c]	PM_{10} (lb/day)
Air Compressor	1	6.83	0.85	5.82	0.14	0.27
Total per 10 acres of activity	1	6.83	0.85	5.82	0.14	0.27

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activitiy, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) The SMAQMD 2004 reference lists emission factors for reactive organic gas (ROG). For the purposes of this worksheet ROG = VOC.

c) The SMAQMD 2004 reference does not provide SO_2 emission factors. For this worksheet, SO_2 emissions have been estimated based on approximate fuel use rate for diesel equipment and the assumption of 500 ppm sulfur diesel fuel. For the average of the equipment fleet, the resulting SO_2 factor was found to be approximately 0.04 times the NOx emission factor for the mobile equipment (based upon 2002 USAF IERA "Air Emissions Inventory Guidance") and 0.02 times the NOx emission factor for all other equipment (based on AP-42, Table 3.4-1)

d) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	SMAQMD Emission Factors (lb/day)				
		NO_x	VOC	CO	SO_2**	PM_{10}
Grading Equipment	1	26.254	3.914	30.671	0.525	0.881
Paving Equipment	1	0.000	0.000	0.000	0.000	0.000
Demolition Equipment	1	0.000	0.000	0.000	0.000	0.000
Building Construction	1	0.000	0.000	0.000	0.000	0.000
Air Compressor for Architectural Coating	1	0.000	0.000	0.000	0.000	0.000
Architectural Coating**			0.000			

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Example: SMAQMD Emission Factor for Grading Equipment NOx = (Total Grading NOx per 10 ac*((total disturbed area/43560)/10))*(Equipment Multiplier)

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	189,000	4.34	3	(from "CY2007 Grading" worksheet)
Paving:	0	0.00	0	
Demolition:	0	0.00	60	
Building Construction:	0	0.00	0	
Architectural Coating	0	0.00	0	(per the SMAQMD "Air Quality of Thresholds of Significance", 1994)

NOTE: The 'Total Days' estimate for paving is calculated by dividing the total number of acres by 0.21 acres/day, which is a factor derived from the 2005 MEANS Heavy Construction Cost Data, 19th Edition, for 'Asphaltic Concrete Pavement, Lots and Driveways - 6" stone base', which provides an estimate of square feet paved per day. There is also an estimate for 'Plain Cement Concrete Pavement', however the estimate for asphalt is used because it is more conservative. The 'Total 'Days' estimate for demolition is calculated by dividing the total number of acres by 0.02 acres/day, which is a factor also derived from the 2005 MEANS reference. This is calculated by averaging the demolition estimates from 'Building Demolition - Small Buildings, Concrete', assuming a height of 30 feet for a two-story building; from 'Building Footings and Foundations Demolition - 6" Thick, Plain Concrete'; and from 'Demolish, Remove Pavement and Curb - Concrete to 6" thick, rod reinforced'. Paving is double-weighted since projects typically involve more paving demolition. The 'Total Days' estimate for building construction is assumed to be 230 days, unless project-specific data is known.

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}
Grading Equipment	78.76	11.74	92.01	1.58	2.64
Paving	-	-	-	-	-
Demolition	-	-	-	-	-
Building Construction	-	-	-	-	-
Architectural Coatings	-	-	-	-	-
Total Emissions (lbs):	**78.76**	**11.74**	**92.01**	**1.58**	**2.64**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}
Total Project Emissions (lbs)	78.76	11.74	92.01	1.58	2.64
Total Project Emissions (tons)	0.04	0.01	0.05	0.00	0.00

Construction Fugitive Dust Emissions for CY 2007

Calculation of PM_{10} Emissions Due to Site Preparation (Uncontrolled).

User Input Parameters / Assumptions

Acres graded per year:	4.34	acres/yr	(From "CY2007 Combustion" worksheet)
Grading days/yr:	2.42	days/yr	(From "CY2007 Grading worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.56 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	30	%	(http://www.cpc.noaa.gov/products/soilmst/w.shtml)
Annual rainfall days, p:	90	days/yr rainfall exceeds 0.01 inch/day (AP-42 Fig 13.2.2-1)	
Wind speed > 12 mph %, I:	20	%	Ave. of wind speed at Spokane, WA (ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose/washington/spokane/)
Fraction of TSP, J:	0.5	per California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993, p. A9-99	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	3.00	vehicles	(From "CY2007 Grading worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM_{10} Adjustment Factor k	1.5	lb/VMT	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor a	0.9	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
PM_{10} Adjustment Factor b	0.45	(dimensionless)	(AP-42 Table 13.2.2-2 12/03 for PM_{10} for unpaved roads)
Mean Vehicle Weight W	40	tons	assumed for aggregate trucks

TSP - Total Suspended Particulate
VMT - Vehicle Miles Traveled

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	4.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	15	VMT/day	
Construction VMT per acre	8.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-1, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-1,
Vehicle Traffic (unpaved roads)	$[(k(s/12)^{a} (W/3)^{b})]\ [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 10/98 and Section 13.2 dated 12/03

Calculation of PM_{10} Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.16 lbs/hr	4.5 hr/acre	0.70 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.80 lbs/acre
Vehicle Traffic (unpaved roads)	2.66 lbs/VMT	8.4 VMT/acre	22.30 lbs/acre

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: California Environmental Quality Act (CEQA) Air Quality Handbook, SCAQMD, 1993.

Soil Piles EF = 1.7(s/1.5)[(365 - p)/235](I/15)(J) = (s)(365 - p)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 7.5 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 0.75 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM_{10} Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0.70 lbs/acre	4.34	NA	3	0.002
Grading	0.80 lbs/acre	4.34	NA	3	0.002
Vehicle Traffic	22.30 lbs/acre	4.34	NA	97	0.048
Erosion of Soil Piles	0.75 lbs/acre/day	4.34	90	293	0.146
Erosion of Graded Surface	26.40 lbs/acre/day	4.34	90	10,309	5.155
TOTAL				10,705	5.35

Soil Disturbance EF: 23.80 lbs/acre
Wind Erosion EF: 27.15 lbs/acre/day

Back calculate to get EF: 1,018.11 lbs/acre/grading day

Construction (Grading) Schedule for CY 2007

Estimate of time required to grade a specified area.

Input Parameters

Construction area: 4.34 acres/yr (from "CY2007 Combustion" Worksheet)

Qty Equipment: 3.00 (calculated based on 3 pieces of equipment for every 10 acres)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 19th Ed., R. S. Means, 2005.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr (project-specific)	Equip-days per year
2230 200 0550	Site Clearing	Dozer & rake, medium brush	8	acre/day	8	0.13	4.34	0.54
2230 500 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	4.34	2.12
2315 432 5220	Excavation	Bulk, open site, common earth, 150' haul	800	cu. yd/day	0.99	1.01	2.17	2.19
2315 120 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	2.17	0.90
2315 310 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	2,300	cu. yd/day	2.85	0.35	4.34	1.52
TOTAL								7.27

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 7.27
Qty Equipment: 3.00
Grading days/yr: 2.42

Eastern Washington-Northern Idaho Interstate Air Quality Control Region (EWNII AQCR)

			Area Source Emissions						Point Source Emissions					
Row #	State	County	CO	NOx	PM10	PM2.5	SO2	VOC	CO	NOx	PM10	PM2.5	SO2	VOC
SORT														
1	WA	Adams Co	17,897	4,027	10,710	2,369	231	1,957	0	0	0	0	0	0
2	WA	Asotin Co	4,457	533	1,516	396	42.4	719	0	0	0	0	0	0
3	WA	Columbia Co	4,778	385	3,100	692	42.1	1,554	0	0	0	0	0	0
4	WA	Garfield Co	2,408	395	3,195	800	42.6	469	0	0	0	0	0	0
5	WA	Grant Co	39,086	6,036	13,724	3,149	353	5,149	64	22	72	57.2	0	5
6	WA	Lincoln Co	11,933	2,972	9,693	2,318	208	1,860	0	0	0	0	0	0
7	WA	Spokane Co	124,157	16,117	12,258	4,285	1,017	18,702	22,765	1,234	650	493	5,237	1,149
8	WA	Whitman Co	10,135	2,506	16,692	3,603	246	2,577	240	286	53	33.4	173	32
9	ID	Benewah Co	10,936	892	6,328	1,943	90.1	3,245	0	0	0	0	0	0
10	ID	Kootenai Co	55,330	9,045	26,419	6,583	446	18,933	792	538	429	353	8.04	389
11	ID	Latah Co	26,924	2,405	11,723	4,396	205	6,697	148	73.7	217	132	4.6	81.1
12	ID	Nez Perce Co	27,505	2,481	8,362	3,997	171	8,175	3,242	2,365	691	470	139	700
13	ID	Shoshone Co	9,511	1,488	7,294	1,401	238	4,437	0	0	0	0	0	0
Grand Total			345,057	49,282	131,014	35,932	3,332	74,474	27,251	4,519	2,112	1,539	5,562	2,356

SOURCE:
http://www.epa.gov/air/data/geosel.html
USEPA - AirData NET Tier Report
*Net Air pollution sources (area and point) in tons per year (2001)
Site visited on 4 April 2006

EWNII AQCR : Adams Co, Asotin Co, Columbia Co, Garfield Co, Grant Co, Lincoln Co, Spokane Co, and Whitman Co, WA; and Benewah Co, Kootenai Co, Latah Co, Nez Perce Co, and Shoshone Co, ID.